ESTUDIO DE SINTONIZACIÓN DE ESTABILIZADORES DE SISTEMAS DE POTENCIA (PSS)

ANEXO A Informe Preliminar

GERENCIA DE OPERACIÓN

Abril 2024

Estudio de Sintonización de Estabilizadores de Sistemas de Potencia (PSS)
Informe preparado por el Departamento de Estudios Eléctricos

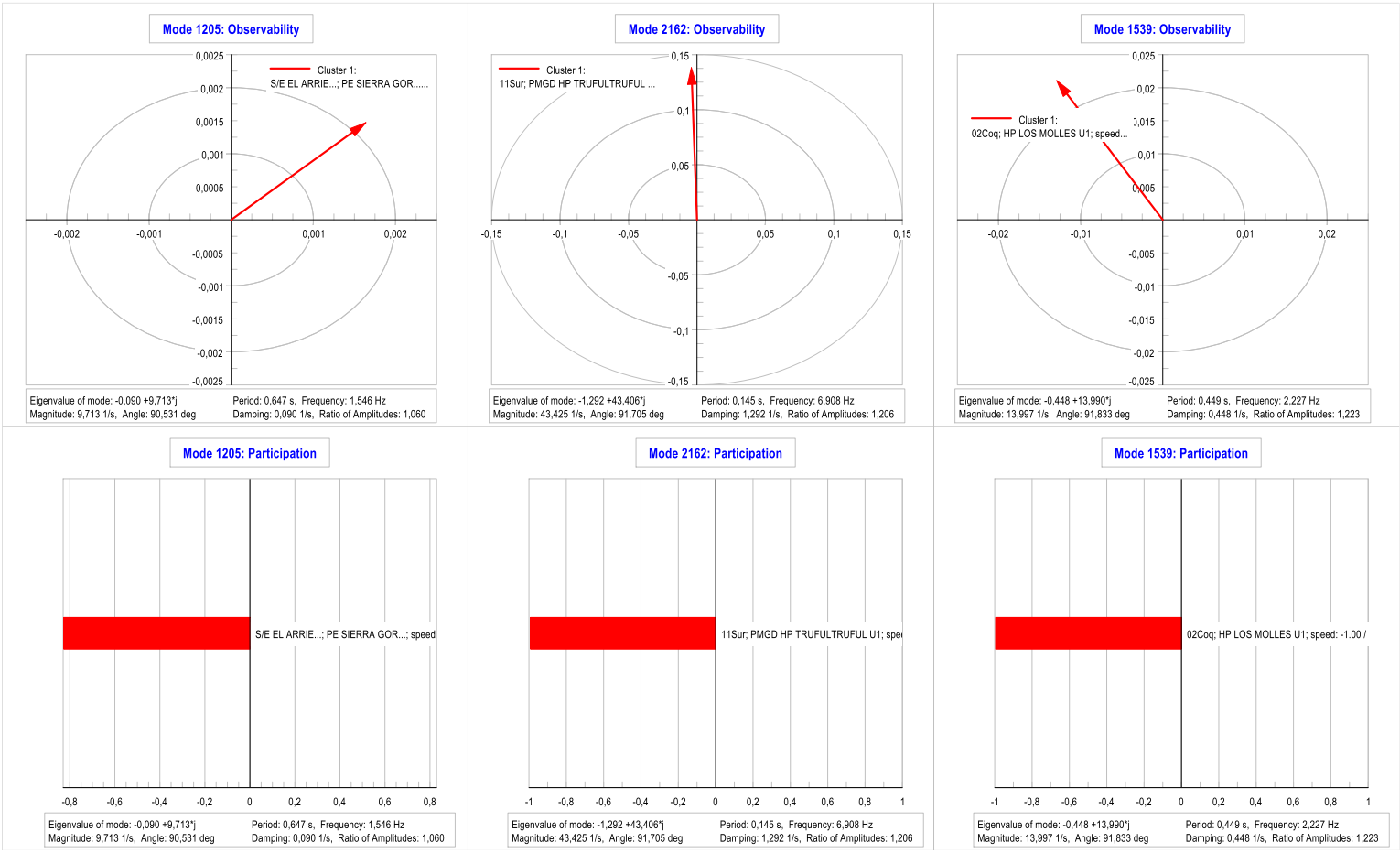
Rev.	Fecha	Comentario	Realizó	Revisó / Aprobó
1	19-04-2024	Anexo A Informe Preliminar	Carlos Alvear A. Hernán Barra C. Michelle Cajas R. Marcelo Cifuentes R. Carlos Prieto C	Eugenio Quintana P. Víctor Velar

CONTENIDO

15 MODOS CRÍTICOS

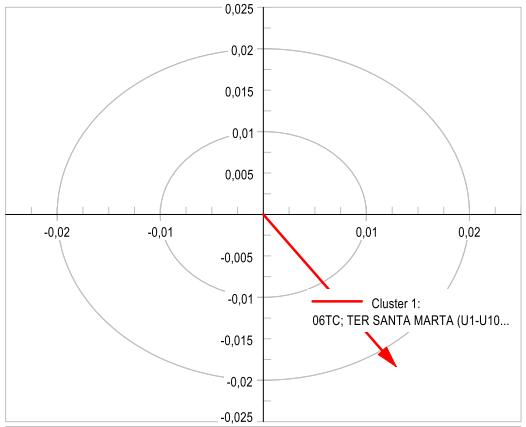
15.1 Escenario E1 DA día Mar2024

15.1.1 Red N



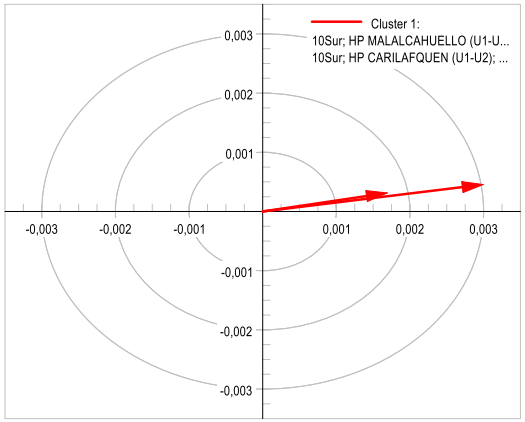
COORDINADOR ELÉCTRICO NACIONAL

Mode 1437: Observability



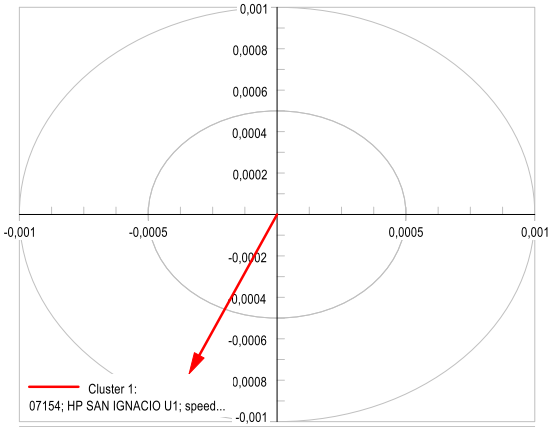
Eigenvalue of mode: -0,272 +7,052*j
Magnitude: 7,057 1/s, Angle: 92,206 deg
Period: 0,891 s, Frequency: 1,122 Hz
Damping: 0,272 1/s, Ratio of Amplitudes: 1,274

Mode 1424: Observability



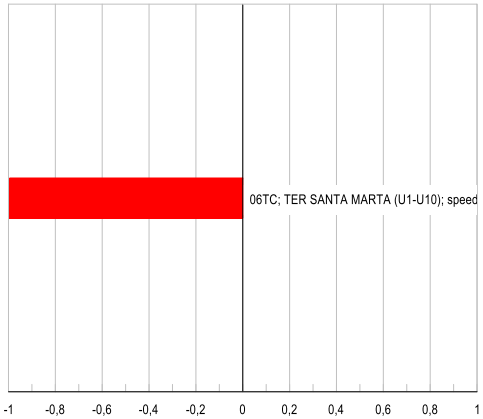
Eigenvalue of mode: -0,257 +5,430*j
Magnitude: 5,436 1/s, Angle: 92,706 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,257 1/s, Ratio of Amplitudes: 1,346

Mode 1543: Observability



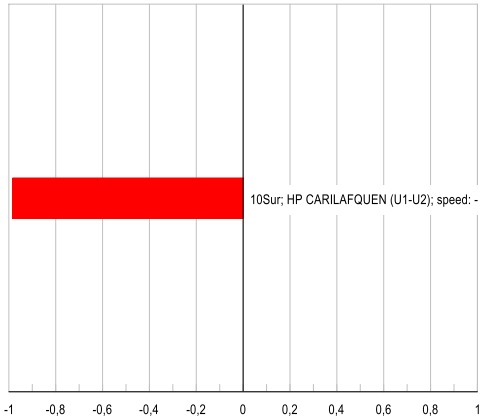
Eigenvalue of mode: -0,451 +8,688*j
Magnitude: 8,700 1/s, Angle: 92,971 deg
Period: 0,723 s, Frequency: 1,383 Hz
Damping: 0,451 1/s, Ratio of Amplitudes: 1,386

Mode 1437: Participation



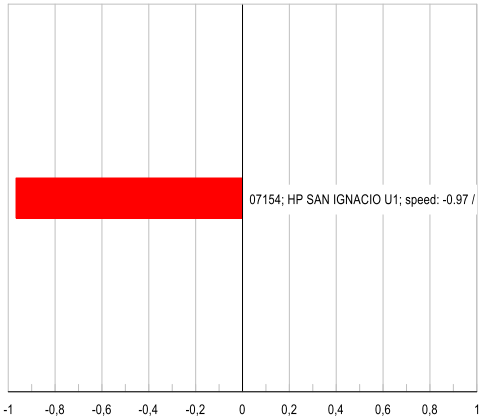
Eigenvalue of mode: -0,272 +7,052*j
Magnitude: 7,057 1/s, Angle: 92,206 deg
Period: 0,891 s, Frequency: 1,122 Hz
Damping: 0,272 1/s, Ratio of Amplitudes: 1,274

Mode 1424: Participation



Eigenvalue of mode: -0,257 +5,430*j
Magnitude: 5,436 1/s, Angle: 92,706 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,257 1/s, Ratio of Amplitudes: 1,346

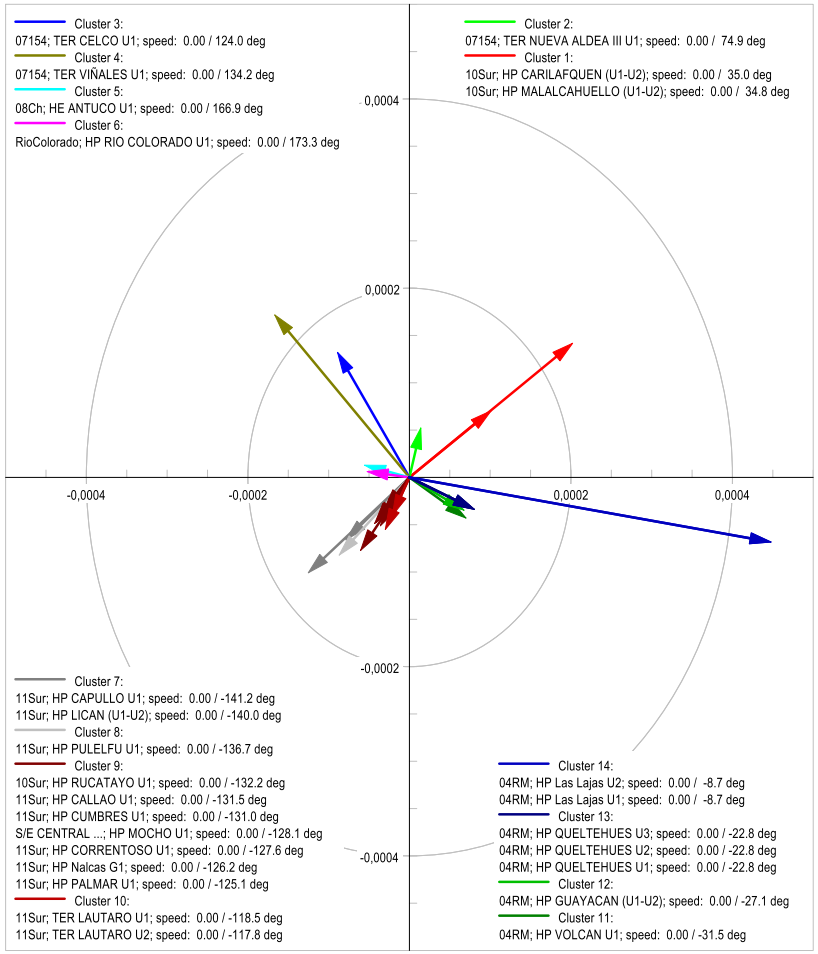
Mode 1543: Participation



Eigenvalue of mode: -0,451 +8,688*j
Magnitude: 8,700 1/s, Angle: 92,971 deg
Period: 0,723 s, Frequency: 1,383 Hz
Damping: 0,451 1/s, Ratio of Amplitudes: 1,386

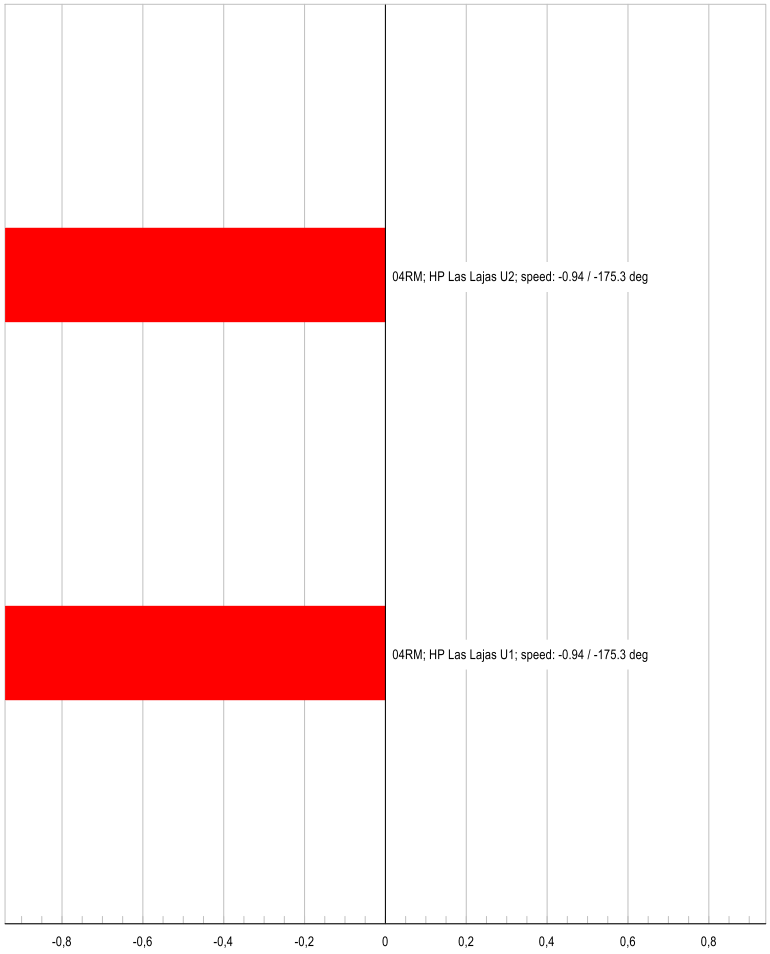
COORDINADOR ELÉCTRICO NACIONAL

Mode 1488: Observability



Eigenvalue of mode: -0,354 +5,688*j
Magnitude: 5,699 1/s, Angle: 93,565 deg
Period: 1,105 s, Frequency: 0,905 Hz
Damping: 0,354 1/s, Ratio of Amplitudes: 1,479

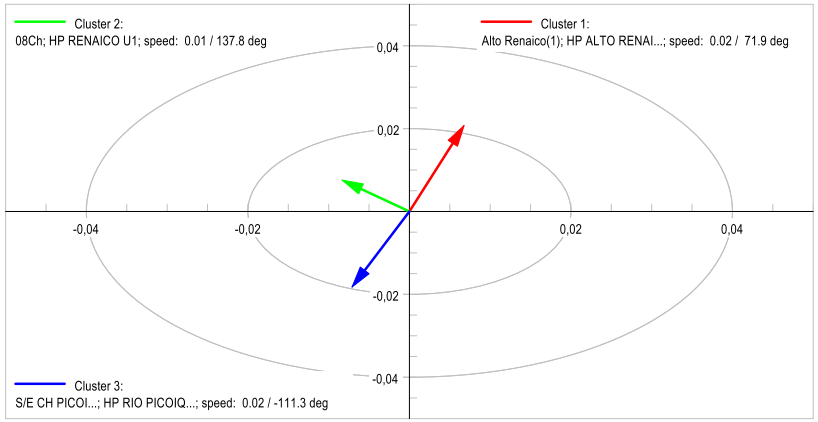
Mode 1488: Participation



Eigenvalue of mode: -0,354 +5,688*j
Magnitude: 5,699 1/s, Angle: 93,565 deg
Period: 1,105 s, Frequency: 0,905 Hz
Damping: 0,354 1/s, Ratio of Amplitudes: 1,479

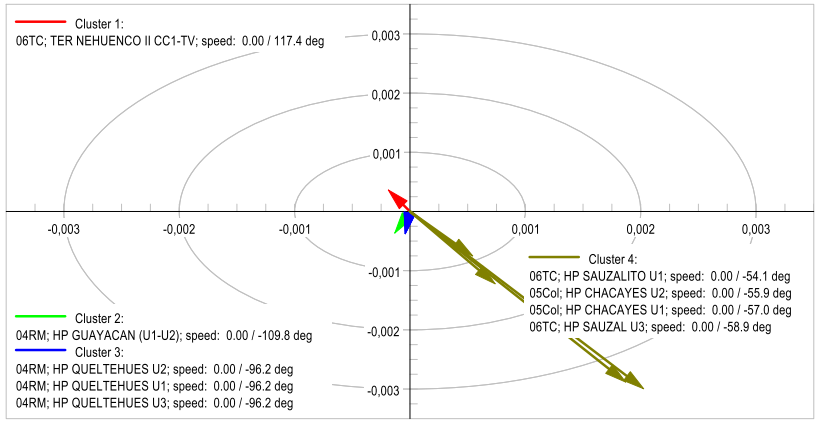
COORDINADOR ELÉCTRICO NACIONAL

Mode 2180: Observability



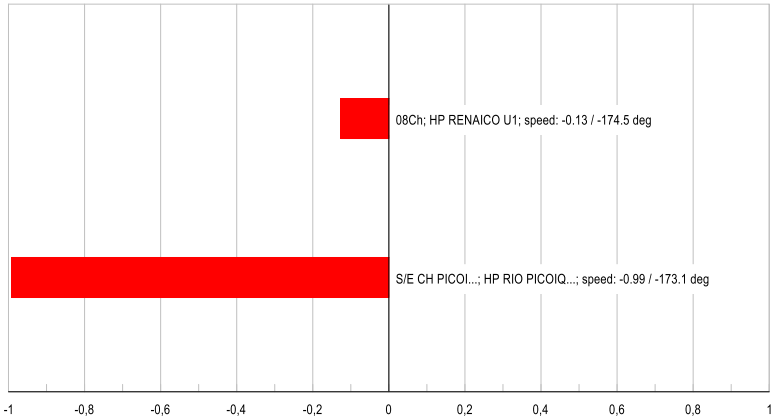
Eigenvalue of mode: -1,335 +20,479*j
Magnitude: 20,523 1/s, Angle: 93,731 deg
Period: 0,307 s, Frequency: 3,259 Hz
Damping: 1,335 1/s, Ratio of Amplitudes: 1,506

Mode 1661: Observability



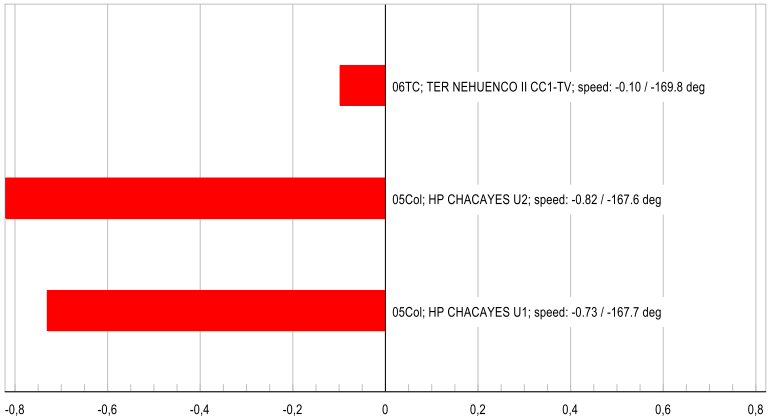
Eigenvalue of mode: -0,519 +7,832*j
Magnitude: 7,850 1/s, Angle: 93,791 deg
Period: 0,802 s, Frequency: 1,247 Hz
Damping: 0,519 1/s, Ratio of Amplitudes: 1,516

Mode 2180: Participation



Eigenvalue of mode: -1,335 +20,479*j
Magnitude: 20,523 1/s, Angle: 93,731 deg
Period: 0,307 s, Frequency: 3,259 Hz
Damping: 1,335 1/s, Ratio of Amplitudes: 1,506

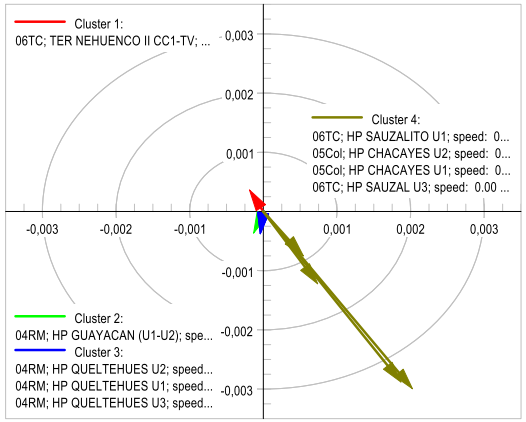
Mode 1661: Participation



Eigenvalue of mode: -0,519 +7,832*j
Magnitude: 7,850 1/s, Angle: 93,791 deg
Period: 0,802 s, Frequency: 1,247 Hz
Damping: 0,519 1/s, Ratio of Amplitudes: 1,516

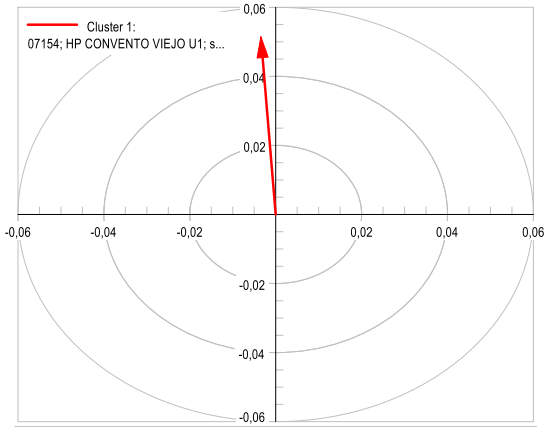
COORDINADOR ELÉCTRICO NACIONAL

Mode 1661: Observability



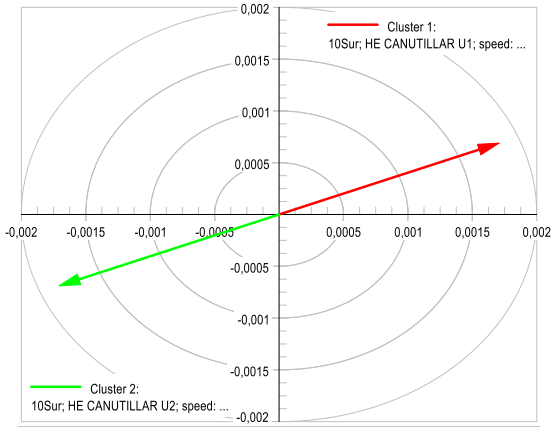
Eigenvalue of mode: -0,519 +7,832*j
Magnitude: 7,850 1/s, Angle: 93,791 deg
Period: 0,802 s, Frequency: 1,247 Hz
Damping: 0,519 1/s, Ratio of Amplitudes: 1,516

Mode 2106: Observability



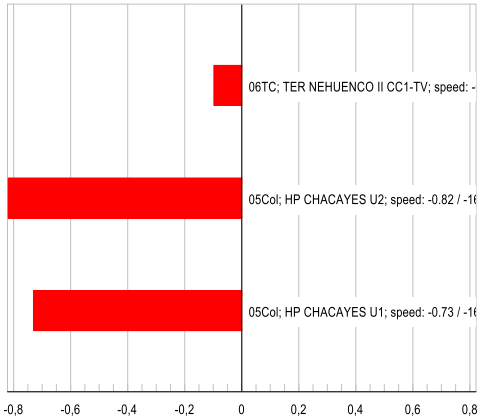
Eigenvalue of mode: -1,082 +16,180*j
Magnitude: 16,216 1/s, Angle: 93,825 deg
Period: 0,388 s, Frequency: 2,575 Hz
Damping: 1,082 1/s, Ratio of Amplitudes: 1,522

Mode 1822: Observability



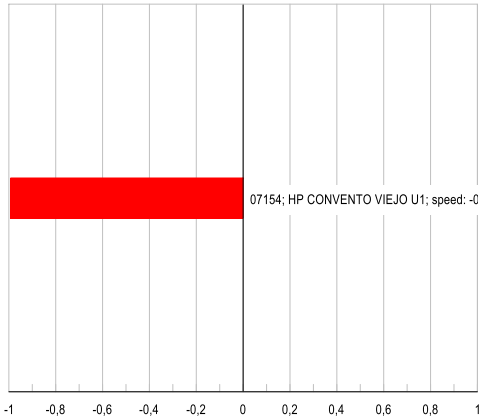
Eigenvalue of mode: -0,843 +11,217*j
Magnitude: 11,249 1/s, Angle: 94,296 deg
Period: 0,560 s, Frequency: 1,785 Hz
Damping: 0,843 1/s, Ratio of Amplitudes: 1,603

Mode 1661: Participation



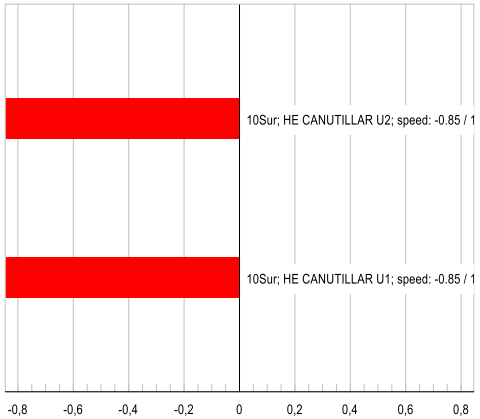
Eigenvalue of mode: -0,519 +7,832*j
Magnitude: 7,850 1/s, Angle: 93,791 deg
Period: 0,802 s, Frequency: 1,247 Hz
Damping: 0,519 1/s, Ratio of Amplitudes: 1,516

Mode 2106: Participation



Eigenvalue of mode: -1,082 +16,180*j
Magnitude: 16,216 1/s, Angle: 93,825 deg
Period: 0,388 s, Frequency: 2,575 Hz
Damping: 1,082 1/s, Ratio of Amplitudes: 1,522

Mode 1822: Participation



Eigenvalue of mode: -0,843 +11,217*j
Magnitude: 11,249 1/s, Angle: 94,296 deg
Period: 0,560 s, Frequency: 1,785 Hz
Damping: 0,843 1/s, Ratio of Amplitudes: 1,603

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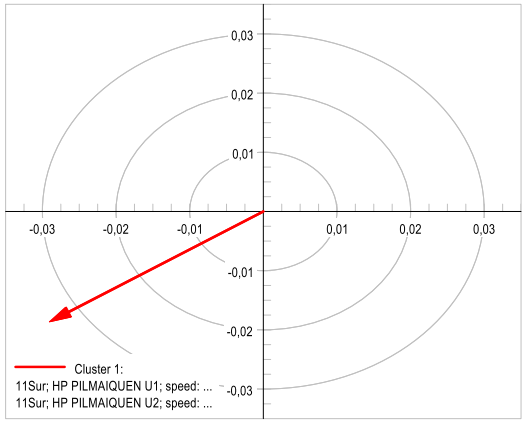
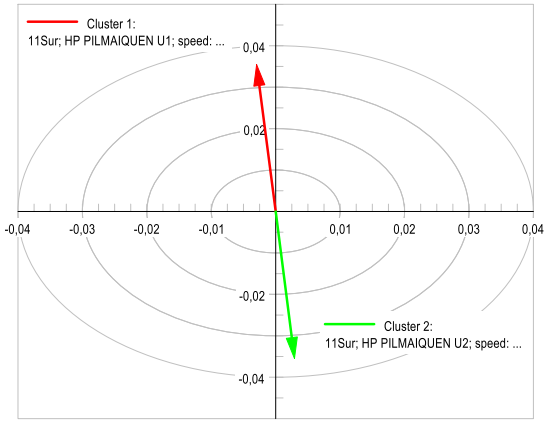
Mode 1844: Observability



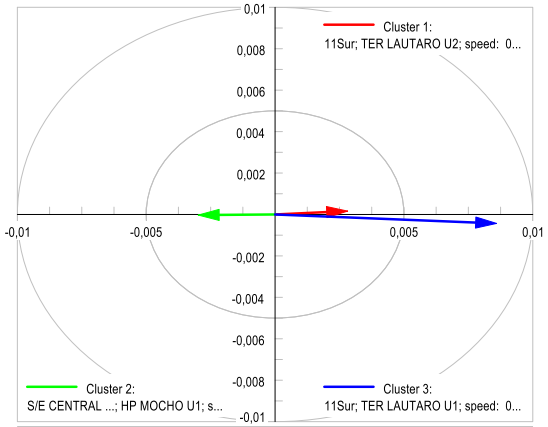
Eigenvalue of mode: -0,853 +10,815*j
Magnitude: 10,849 1/s, Angle: 94,510 deg
Period: 0,581 s, Frequency: 1,721 Hz
Damping: 0,853 1/s, Ratio of Amplitudes: 1,642

Mode 1895: Observability



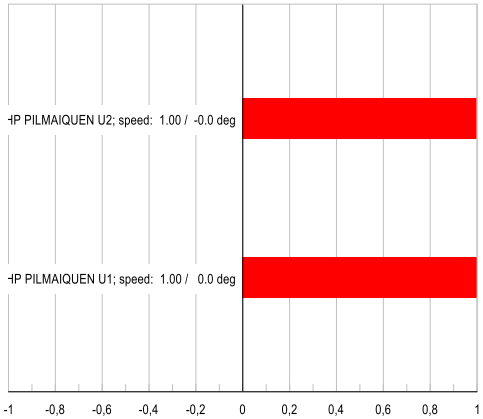
Eigenvalue of mode: -0,931 +11,137*j
Magnitude: 11,176 1/s, Angle: 94,777 deg
Period: 0,564 s, Frequency: 1,773 Hz
Damping: 0,931 1/s, Ratio of Amplitudes: 1,691

Mode 1709: Observability



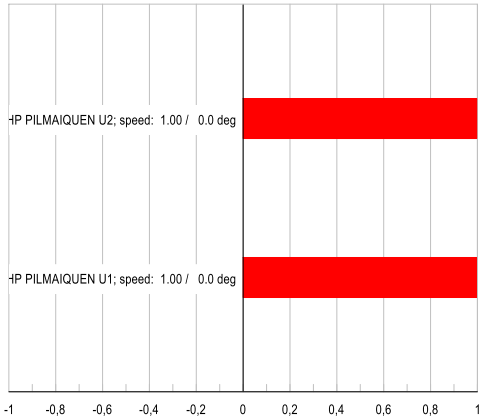
Eigenvalue of mode: -0,613 +7,283*j
Magnitude: 7,309 1/s, Angle: 94,809 deg
Period: 0,863 s, Frequency: 1,159 Hz
Damping: 0,613 1/s, Ratio of Amplitudes: 1,697

Mode 1844: Participation



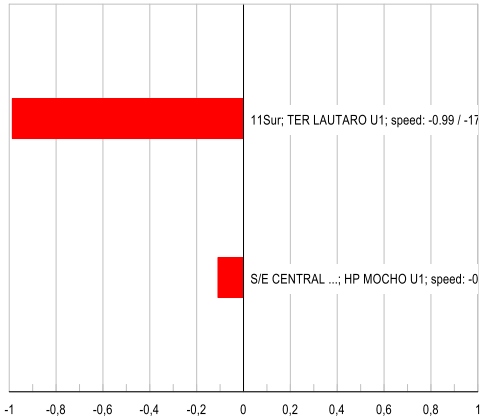
Eigenvalue of mode: -0,853 +10,815*j
Magnitude: 10,849 1/s, Angle: 94,510 deg
Period: 0,581 s, Frequency: 1,721 Hz
Damping: 0,853 1/s, Ratio of Amplitudes: 1,642

Mode 1895: Participation



Eigenvalue of mode: -0,931 +11,137*j
Magnitude: 11,176 1/s, Angle: 94,777 deg
Period: 0,564 s, Frequency: 1,773 Hz
Damping: 0,931 1/s, Ratio of Amplitudes: 1,691

Mode 1709: Participation



Eigenvalue of mode: -0,613 +7,283*j
Magnitude: 7,309 1/s, Angle: 94,809 deg
Period: 0,863 s, Frequency: 1,159 Hz
Damping: 0,613 1/s, Ratio of Amplitudes: 1,697

COORDINADOR
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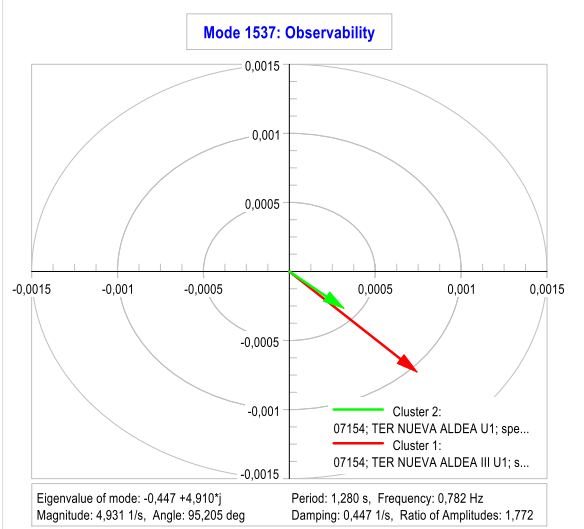
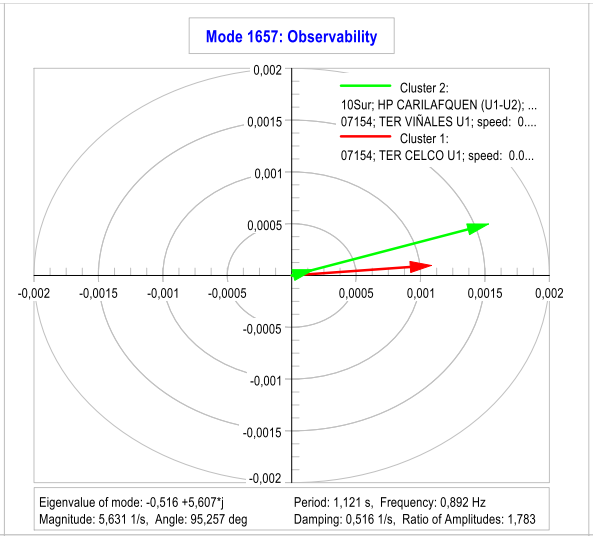
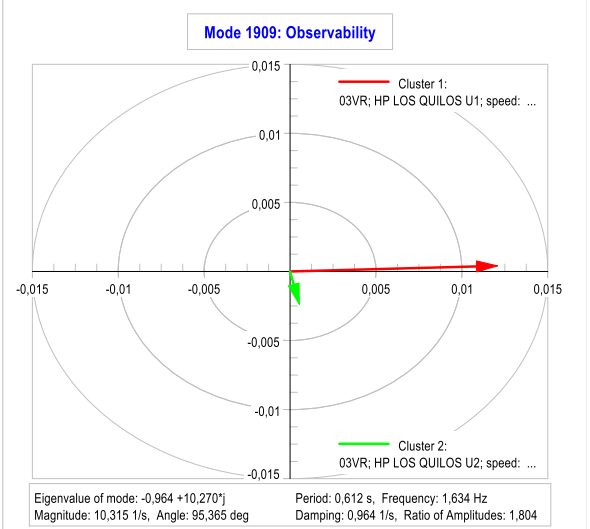
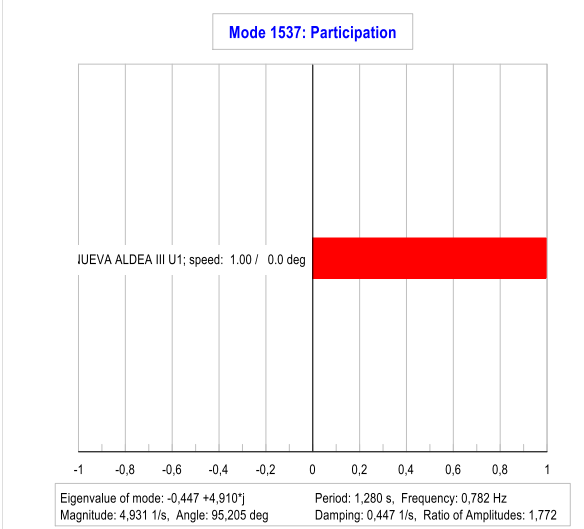
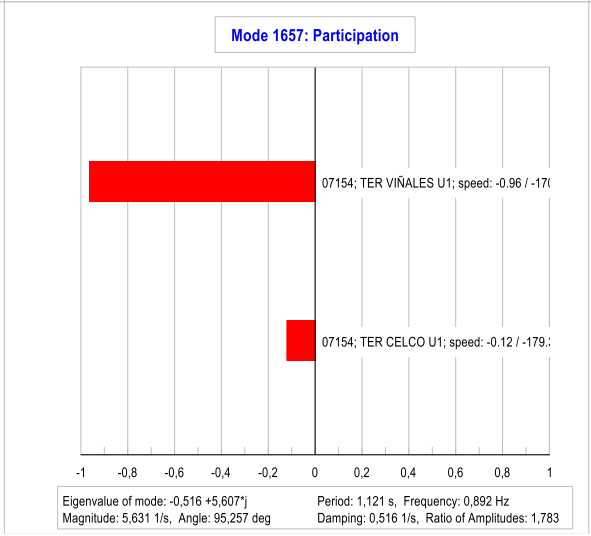
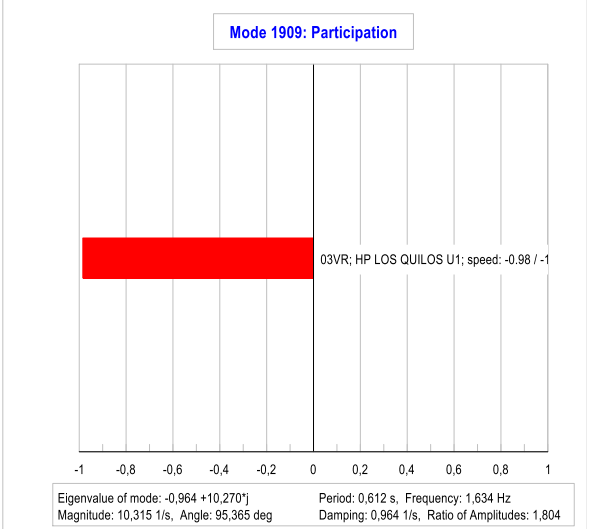




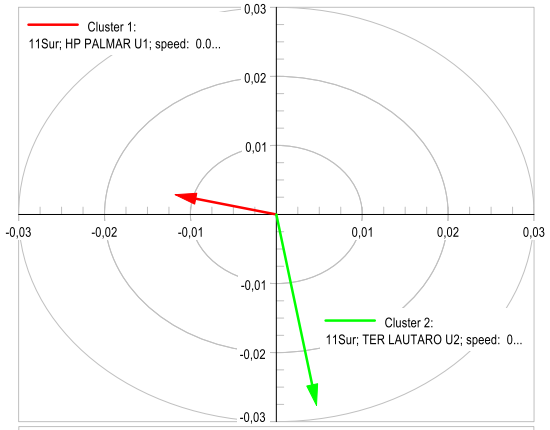






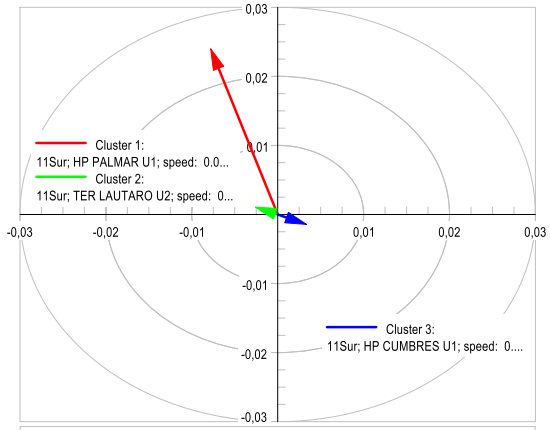


Mode 1858: Observability



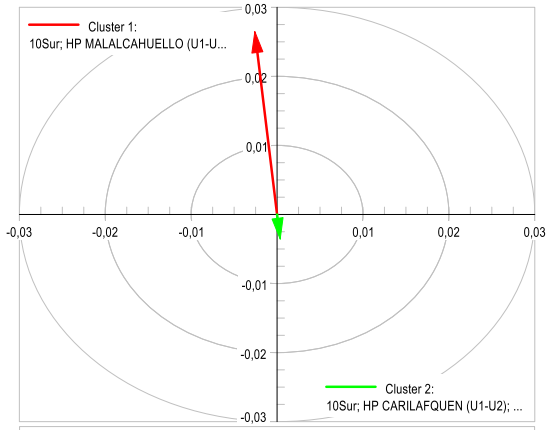
Eigenvalue of mode: -0,868 +9,133*j
Magnitude: 9,174 1/s, Angle: 95,429 deg
Period: 0,688 s, Frequency: 1,454 Hz
Damping: 0,868 1/s, Ratio of Amplitudes: 1,817

Mode 1882: Observability



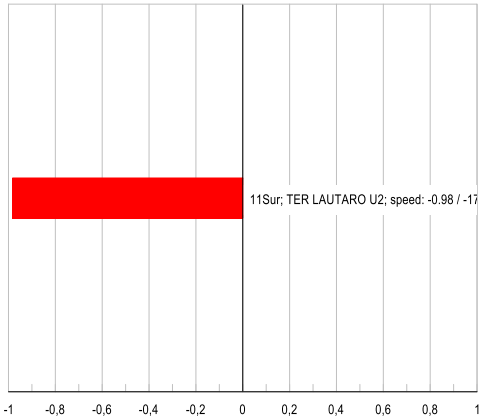
Eigenvalue of mode: -0,890 +9,280*j
Magnitude: 9,323 1/s, Angle: 95,481 deg
Period: 0,677 s, Frequency: 1,477 Hz
Damping: 0,890 1/s, Ratio of Amplitudes: 1,827

Mode 1802: Observability



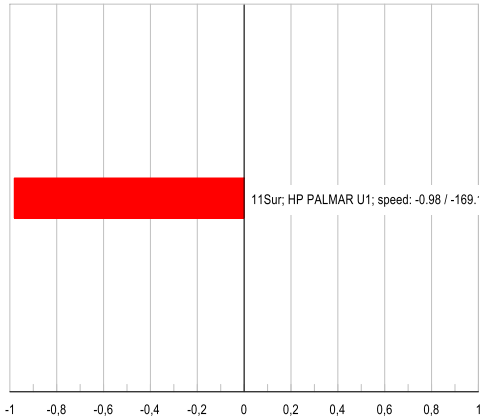
Eigenvalue of mode: -0,815 +8,331*j
Magnitude: 8,370 1/s, Angle: 95,585 deg
Period: 0,754 s, Frequency: 1,326 Hz
Damping: 0,815 1/s, Ratio of Amplitudes: 1,849

Mode 1858: Participation



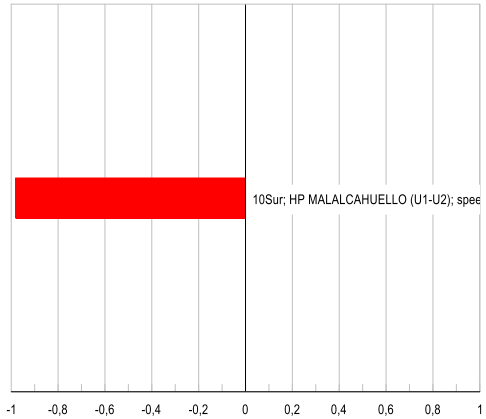
Eigenvalue of mode: -0,868 +9,133*j
Magnitude: 9,174 1/s, Angle: 95,429 deg
Period: 0,688 s, Frequency: 1,454 Hz
Damping: 0,868 1/s, Ratio of Amplitudes: 1,817

Mode 1882: Participation



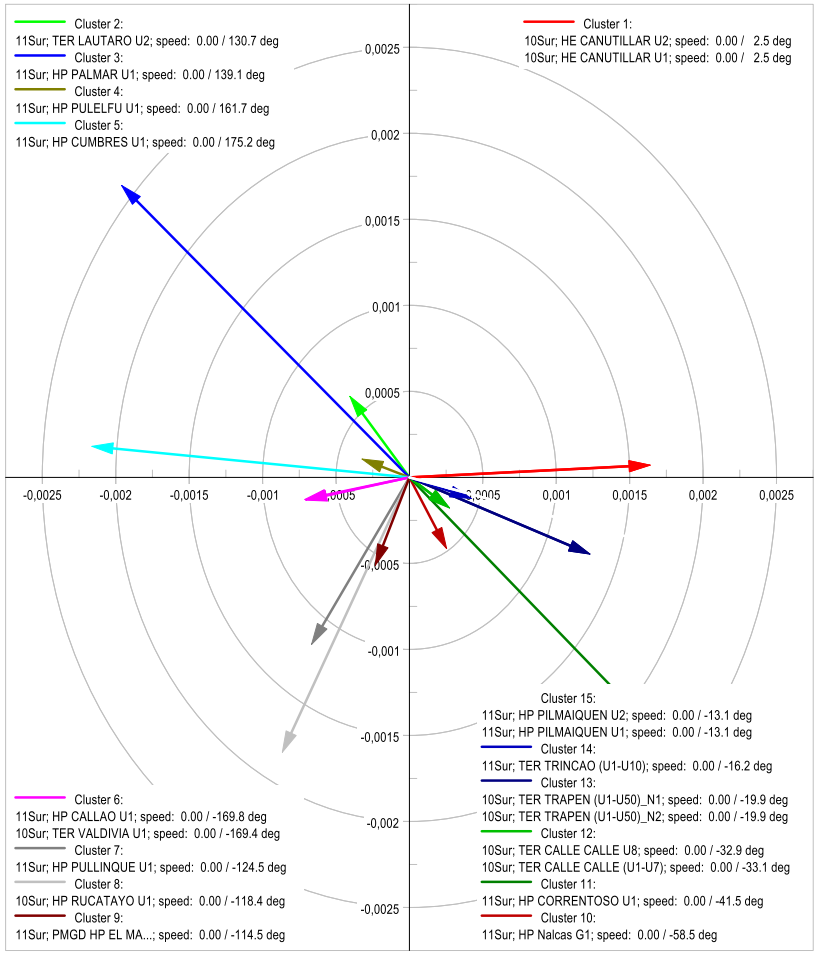
Eigenvalue of mode: -0,890 +9,280*j
Magnitude: 9,323 1/s, Angle: 95,481 deg
Period: 0,677 s, Frequency: 1,477 Hz
Damping: 0,890 1/s, Ratio of Amplitudes: 1,827

Mode 1802: Participation



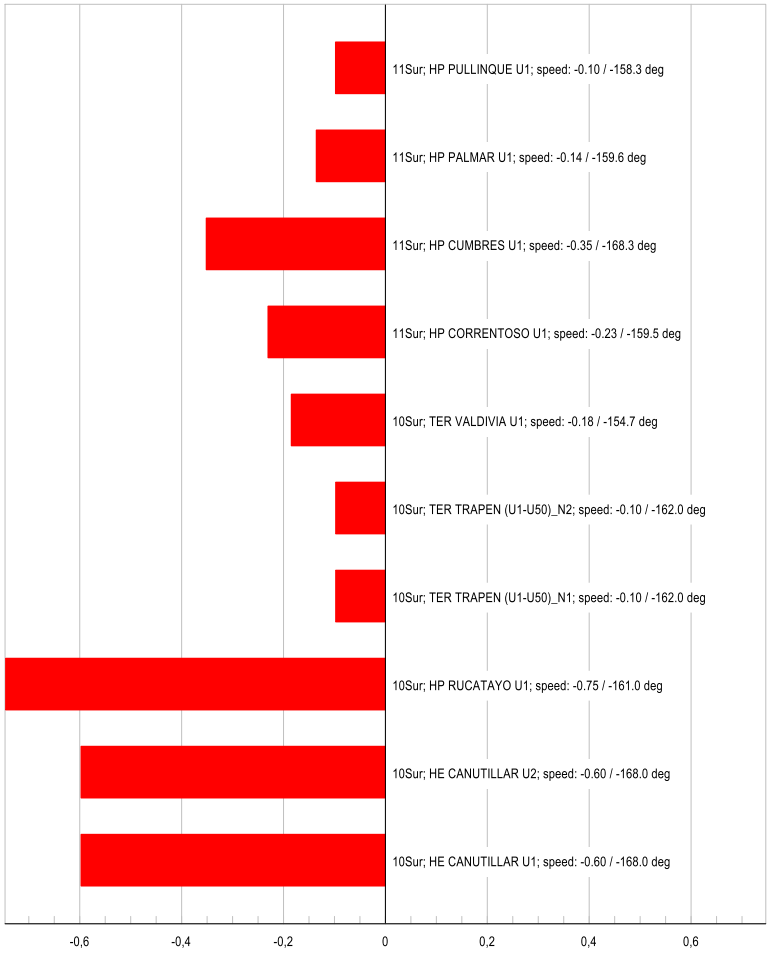
Eigenvalue of mode: -0,815 +8,331*j
Magnitude: 8,370 1/s, Angle: 95,585 deg
Period: 0,754 s, Frequency: 1,326 Hz
Damping: 0,815 1/s, Ratio of Amplitudes: 1,849

Mode 1911: Observability

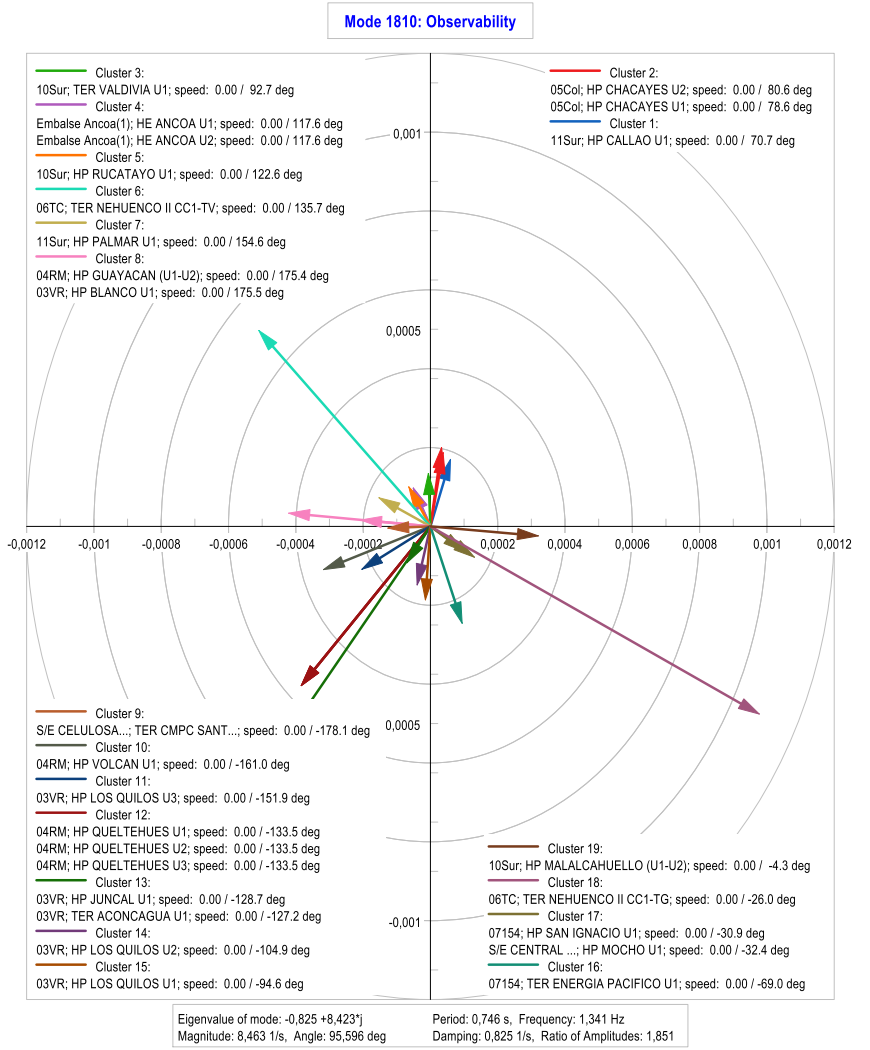


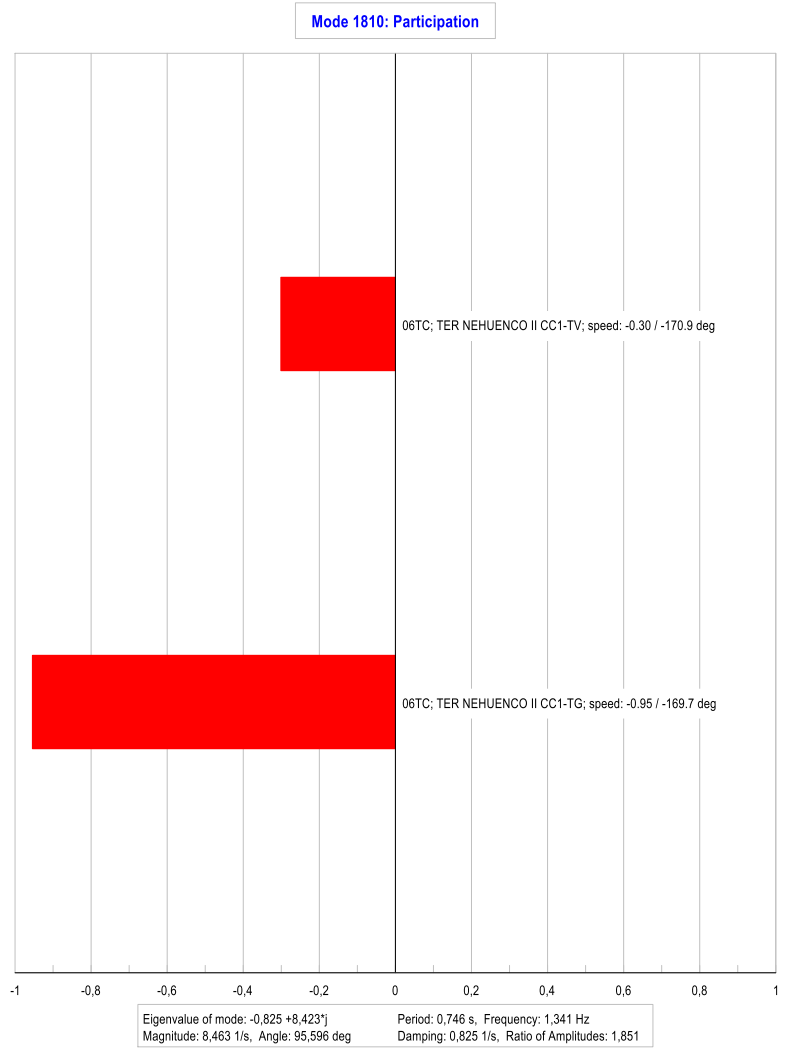
Eigenvalue of mode: -0,968 +9,883*j
Magnitude: 9,930 1/s, Angle: 95,595 deg
Period: 0,636 s, Frequency: 1,573 Hz
Damping: 0,968 1/s, Ratio of Amplitudes: 1,851

Mode 1911: Participation

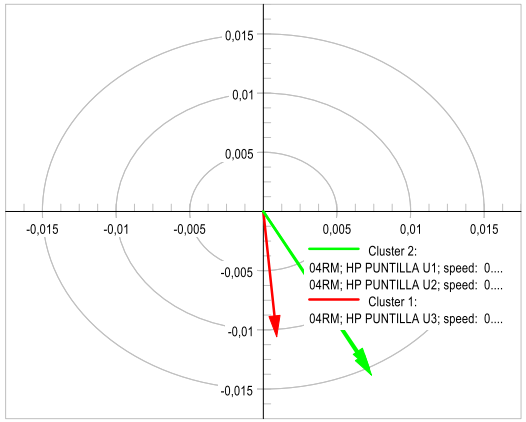


Eigenvalue of mode: -0,968 +9,883*j
Magnitude: 9,930 1/s, Angle: 95,595 deg
Period: 0,636 s, Frequency: 1,573 Hz
Damping: 0,968 1/s, Ratio of Amplitudes: 1,851


Mode 1810: Observability
Cluster 3:
10Sur; TER VALDIVIA U1; speed: 0.00 / 92.7 deg
Cluster 4:
Embalse Ancoa(1); HE ANCOA U1; speed: 0.00 / 117.6 deg
Embalse Ancoa(1); HE ANCOA U2; speed: 0.00 / 117.6 deg
Cluster 5:
10Sur; HP RUCATAYO U1; speed: 0.00 / 122.6 deg
Cluster 6:
06TC; TER NEHUENCO II CC1-TV; speed: 0.00 / 135.7 deg
Cluster 7:
11Sur; HP PALMAR U1; speed: 0.00 / 154.6 deg
Cluster 8:
04RM; HP GUAYACAN (U1-U2); speed: 0.00 / 175.4 deg
03VR; HP BLANCO U1; speed: 0.00 / 175.5 deg
Cluster 2:
05Col; HP CHACAYES U2; speed: 0.00 / 80.6 deg
05Col; HP CHACAYES U1; speed: 0.00 / 78.6 deg
Cluster 1:
11Sur; HP CALLAO U1; speed: 0.00 / 70.7 deg
0,001
0,0005
-0,0012
-0,001
-0,0008
-0,0006
-0,0004
-0,0002
0,0002
0,0004
0,0006
0,0008
0,001
0,0012
Cluster 9:
S/E CELULOSA...; TER CMPC SANT...; speed: 0.00 / -178.1 deg
Cluster 10:
04RM; HP VOLCAN U1; speed: 0.00 / -161.0 deg
Cluster 11:
03VR; HP LOS QUILOS U3; speed: 0.00 / -151.9 deg
Cluster 12:
04RM; HP QUELTEHUES U1; speed: 0.00 / -133.5 deg
04RM; HP QUELTEHUES U2; speed: 0.00 / -133.5 deg
04RM; HP QUELTEHUES U3; speed: 0.00 / -133.5 deg
Cluster 13:
03VR; HP JUNCAL U1; speed: 0.00 / -128.7 deg
03VR; TER ACONCAGUA U1; speed: 0.00 / -127.2 deg
Cluster 14:
03VR; HP LOS QUILOS U2; speed: 0.00 / -104.9 deg
Cluster 15:
03VR; HP LOS QUILOS U1; speed: 0.00 / -94.6 deg
0,0005
-0,001
Cluster 19:
10Sur; HP MALALCAHUELLO (U1-U2); speed: 0.00 / -4.3 deg
Cluster 18:
06TC; TER NEHUENCO II CC1-TG; speed: 0.00 / -26.0 deg
Cluster 17:
07154; HP SAN IGNACIO U1; speed: 0.00 / -30.9 deg
S/E CENTRAL ...; HP MOCHO U1; speed: 0.00 / -32.4 deg
Cluster 16:
07154; TER ENERGIA PACIFICO U1; speed: 0.00 / -69.0 deg
Eigenvalue of mode: -0,825 +8,423*j
Magnitude: 8,463 1/s, Angle: 95,596 deg
Period: 0,746 s, Frequency: 1,341 Hz
Damping: 0,825 1/s, Ratio of Amplitudes: 1,851

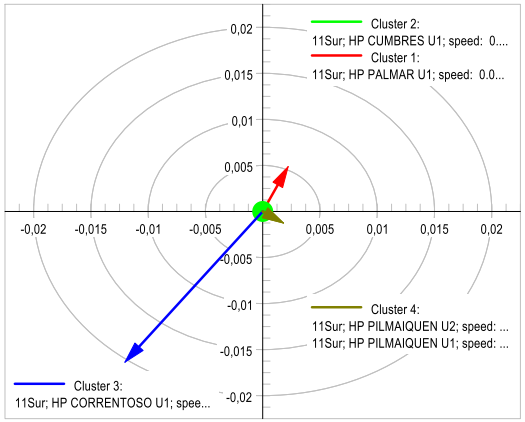

Mode 1810: Participation
06TC; TER NEHUENCO II CC1-TV; speed: -0.30 / -170.9 deg
06TC; TER NEHUENCO II CC1-TG; speed: -0.95 / -169.7 deg
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,825 +8,423*j
Magnitude: 8,463 1/s, Angle: 95,596 deg
Period: 0,746 s, Frequency: 1,341 Hz
Damping: 0,825 1/s, Ratio of Amplitudes: 1,851

Mode 2108: Observability



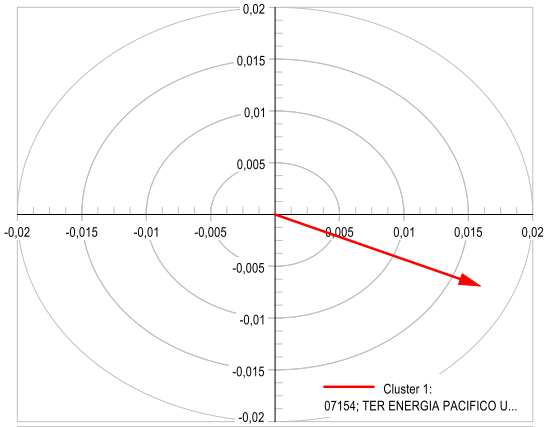
Eigenvalue of mode: -1,089 +11,113*j
Magnitude: 11,167 1/s, Angle: 95,598 deg
Period: 0,565 s, Frequency: 1,769 Hz
Damping: 1,089 1/s, Ratio of Amplitudes: 1,851

Mode 2083: Observability



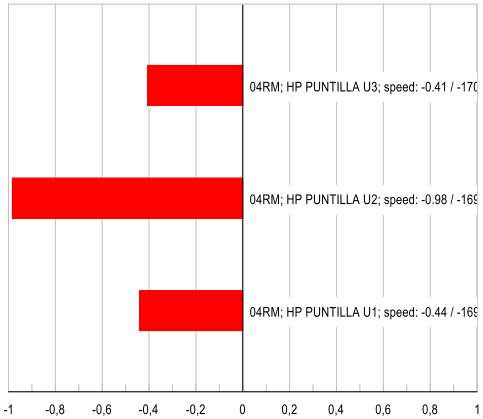
Eigenvalue of mode: -1,022 +10,399*j
Magnitude: 10,449 1/s, Angle: 95,612 deg
Period: 0,604 s, Frequency: 1,655 Hz
Damping: 1,022 1/s, Ratio of Amplitudes: 1,854

Mode 1853: Observability



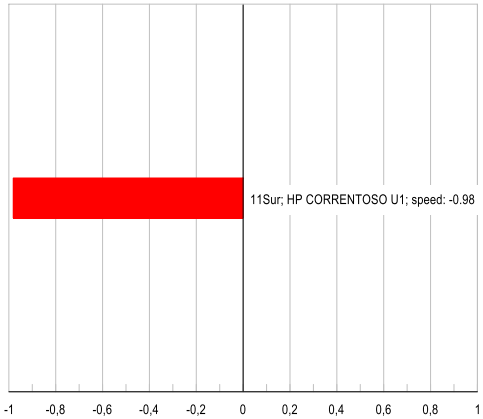
Eigenvalue of mode: -0,865 +8,793*j
Magnitude: 8,835 1/s, Angle: 95,620 deg
Period: 0,715 s, Frequency: 1,399 Hz
Damping: 0,865 1/s, Ratio of Amplitudes: 1,856

Mode 2108: Participation



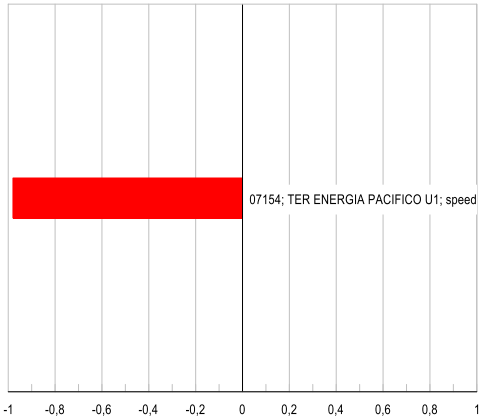
Eigenvalue of mode: -1,089 +11,113*j
Magnitude: 11,167 1/s, Angle: 95,598 deg
Period: 0,565 s, Frequency: 1,769 Hz
Damping: 1,089 1/s, Ratio of Amplitudes: 1,851

Mode 2083: Participation



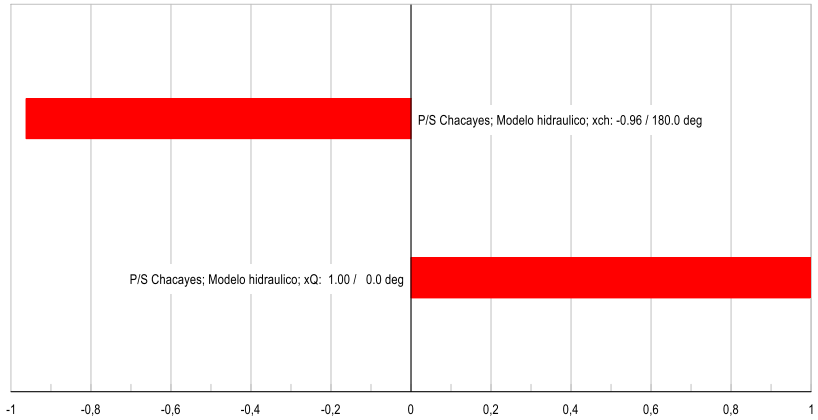
Eigenvalue of mode: -1,022 +10,399*j
Magnitude: 10,449 1/s, Angle: 95,612 deg
Period: 0,604 s, Frequency: 1,655 Hz
Damping: 1,022 1/s, Ratio of Amplitudes: 1,854

Mode 1853: Participation



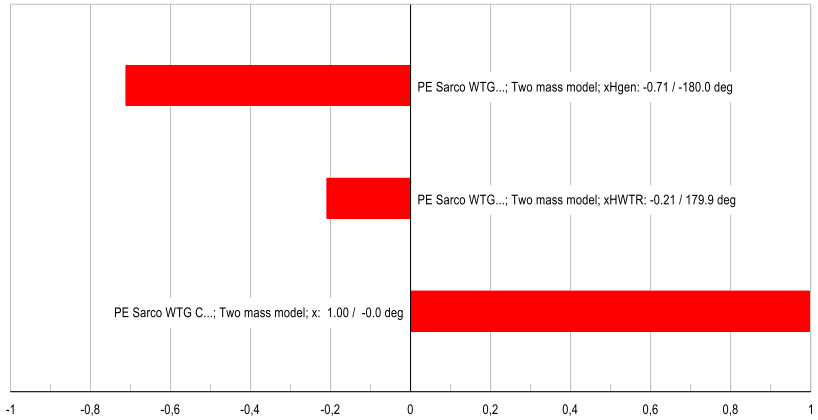
Eigenvalue of mode: -0,865 +8,793*j
Magnitude: 8,835 1/s, Angle: 95,620 deg
Period: 0,715 s, Frequency: 1,399 Hz
Damping: 0,865 1/s, Ratio of Amplitudes: 1,856

Mode 1003: Participation



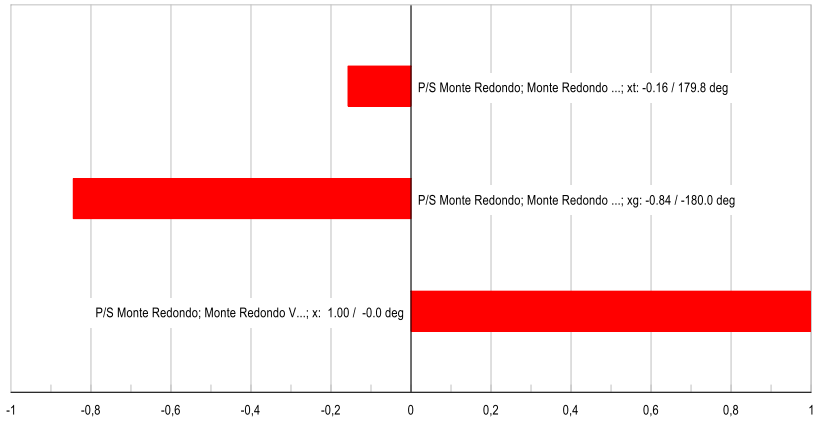
Eigenvalue of mode: -0,001 +0,044*j Period: 142,274 s, Frequency: 0,007 Hz Min. contribution: 0,100
Magnitude: 0,044 1/s, Angle: 91,237 deg Damping: 0,001 1/s, Ratio of Amplitudes: 1,145

Mode 1383: Participation



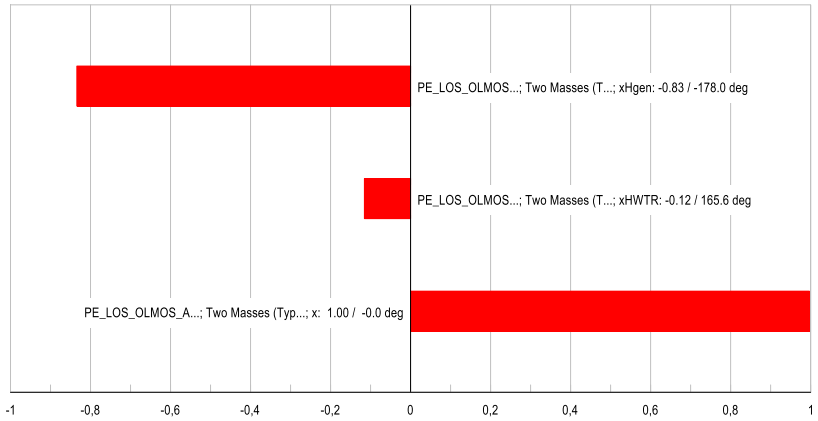
Eigenvalue of mode: -0,214 +8,595*j Period: 0,731 s, Frequency: 1,368 Hz Min. contribution: 0,100
Magnitude: 8,597 1/s, Angle: 91,429 deg Damping: 0,214 1/s, Ratio of Amplitudes: 1,170

Mode 1434: Participation



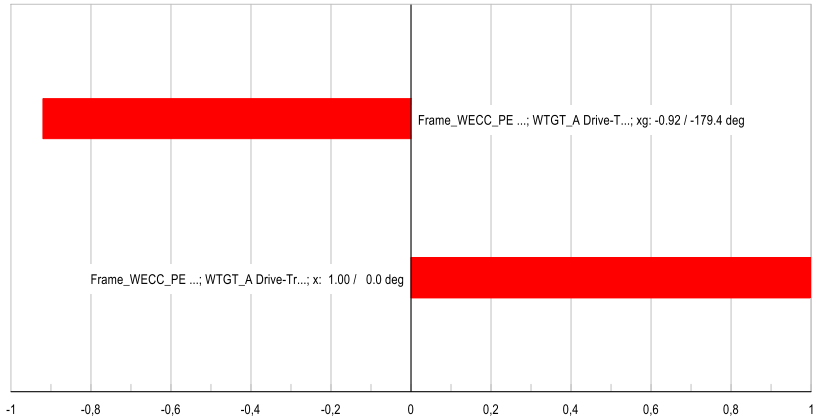
Eigenvalue of mode: -0,268 +9,739*j Period: 0,645 s, Frequency: 1,550 Hz Min. contribution: 0,100
Magnitude: 9,743 1/s, Angle: 91,577 deg Damping: 0,268 1/s, Ratio of Amplitudes: 1,189

Mode 1381: Participation



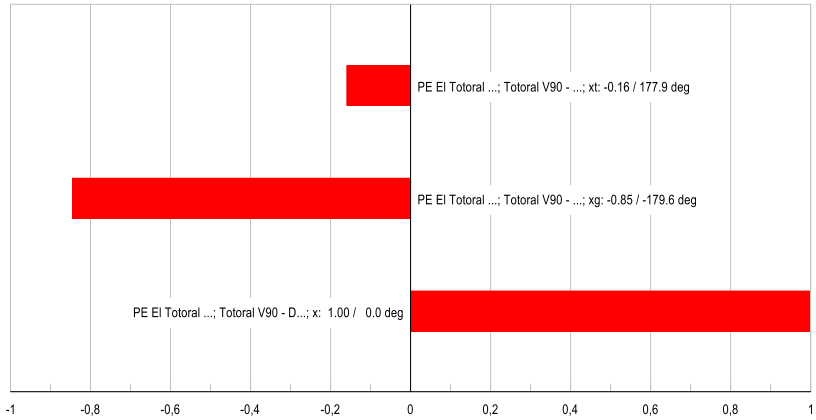
Eigenvalue of mode: -0,213 +6,855*j Period: 0,917 s, Frequency: 1,091 Hz Min. contribution: 0,100
Magnitude: 6,858 1/s, Angle: 91,779 deg Damping: 0,213 1/s, Ratio of Amplitudes: 1,216

Mode 1497: Participation



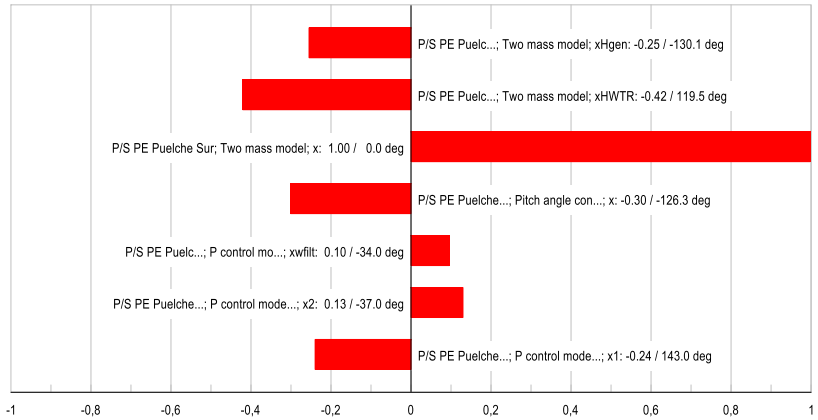
Eigenvalue of mode: -0,375 +9,057*j Period: 0,694 s, Frequency: 1,442 Hz Min. contribution: 0,100
Magnitude: 9,065 1/s, Angle: 92,372 deg Damping: 0,375 1/s, Ratio of Amplitudes: 1,297

Mode 1532: Participation



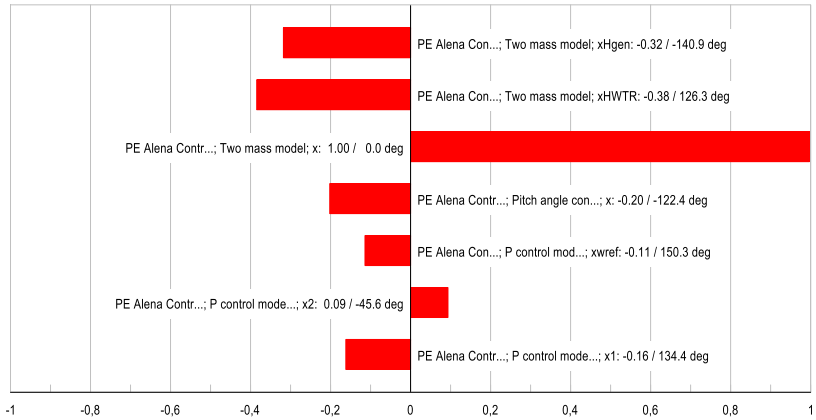
Eigenvalue of mode: -0,441 +9,745*j Period: 0,645 s, Frequency: 1,551 Hz Min. contribution: 0,100
Magnitude: 9,755 1/s, Angle: 92,591 deg Damping: 0,441 1/s, Ratio of Amplitudes: 1,329

Mode 1397: Participation



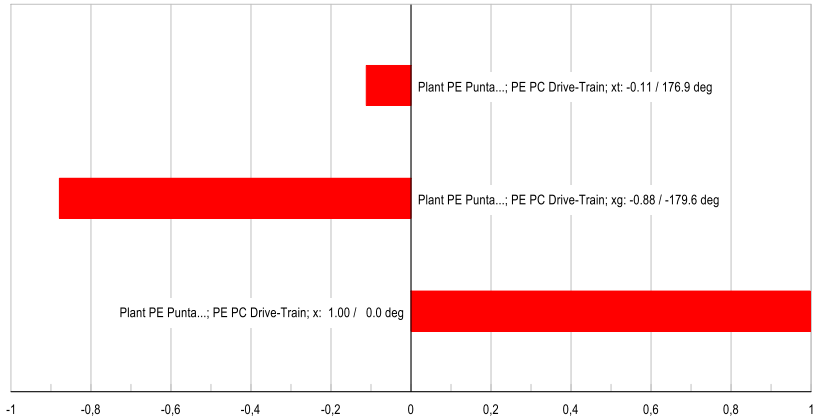
Eigenvalue of mode: -0,240 +5,147*j Period: 1,221 s, Frequency: 0,819 Hz Min. contribution: 0,100
Magnitude: 5,153 1/s, Angle: 92,672 deg Damping: 0,240 1/s, Ratio of Amplitudes: 1,341

Mode 1429: Participation



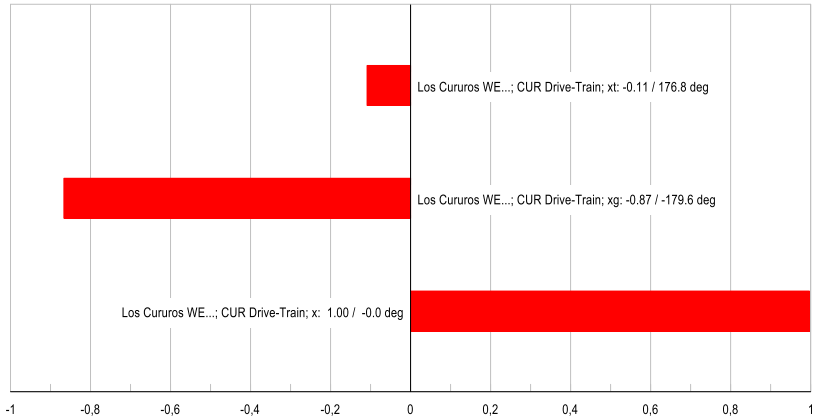
Eigenvalue of mode: -0,262 +5,313*j Period: 1,183 s, Frequency: 0,846 Hz Min. contribution: 0,100
Magnitude: 5,320 1/s, Angle: 92,823 deg Damping: 0,262 1/s, Ratio of Amplitudes: 1,363

Mode 1756: Participation



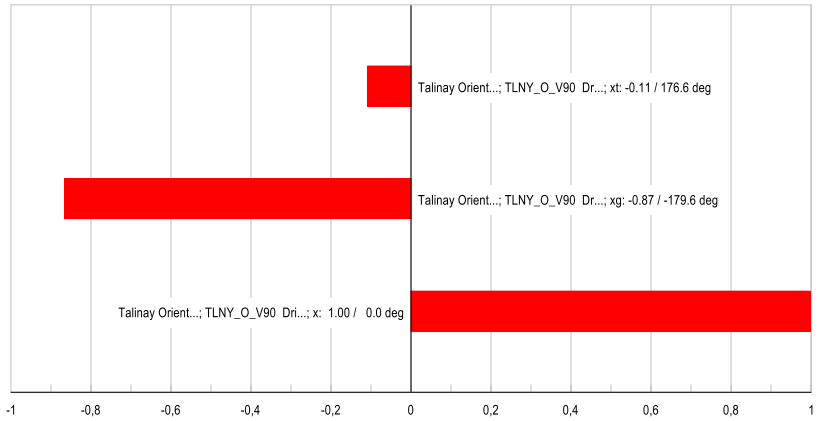
Eigenvalue of mode: -0,701 +12,578*j
Magnitude: 12,598 1/s, Angle: 93,188 deg
Period: 0,500 s, Frequency: 2,002 Hz
Damping: 0,701 1/s, Ratio of Amplitudes: 1,419
Min. contribution: 0,100

Mode 1772: Participation



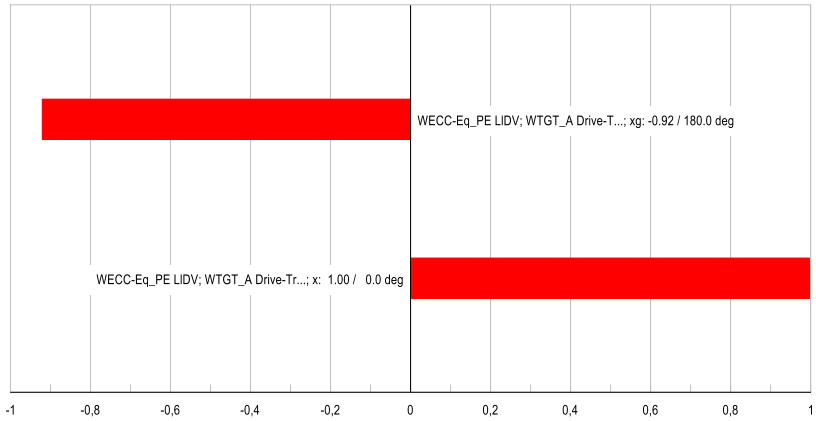
Eigenvalue of mode: -0,725 +12,440*j
Magnitude: 12,461 1/s, Angle: 93,335 deg
Period: 0,505 s, Frequency: 1,980 Hz
Damping: 0,725 1/s, Ratio of Amplitudes: 1,442
Min. contribution: 0,100

Mode 1776: Participation



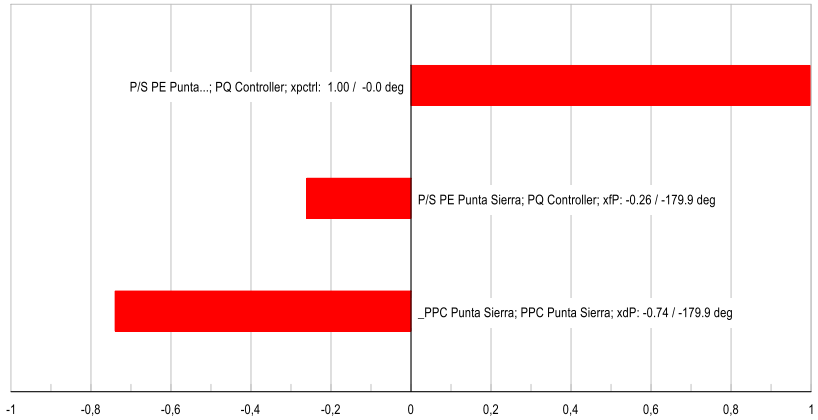
Eigenvalue of mode: -0,744 +12,432*j
Magnitude: 12,454 1/s, Angle: 93,424 deg
Period: 0,505 s, Frequency: 1,979 Hz
Damping: 0,744 1/s, Ratio of Amplitudes: 1,456
Min. contribution: 0,100

Mode 1695: Participation



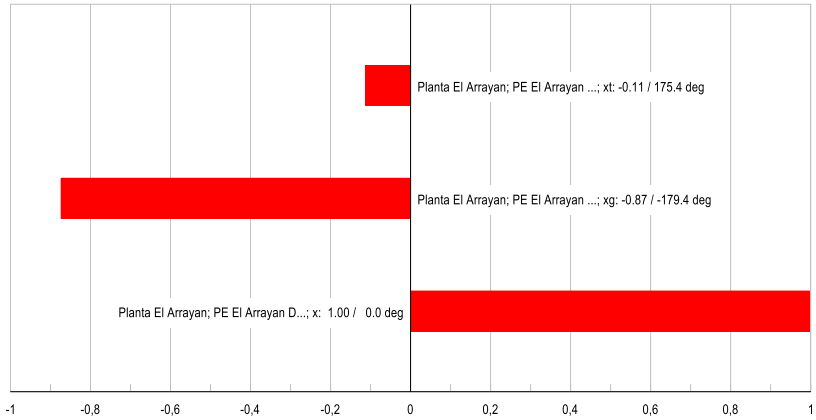
Eigenvalue of mode: -0,581 +9,054*j
Magnitude: 9,073 1/s, Angle: 93,671 deg
Period: 0,694 s, Frequency: 1,441 Hz
Damping: 0,581 1/s, Ratio of Amplitudes: 1,496
Min. contribution: 0,100

Mode 2588: Participation



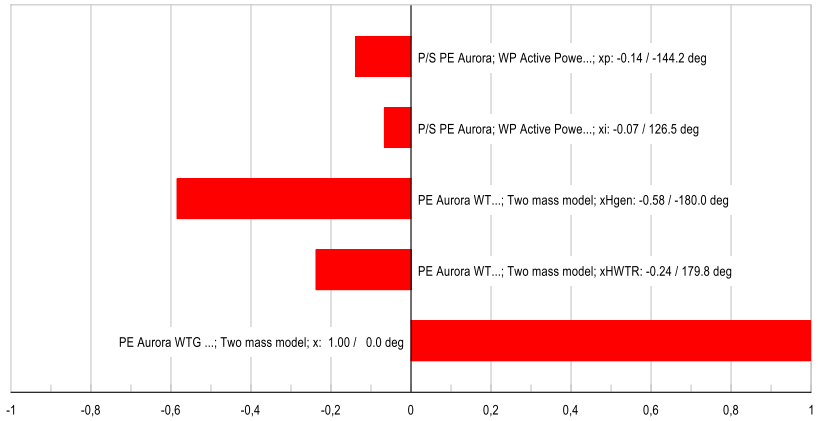
Eigenvalue of mode: -3,696 +56,704*j
Magnitude: 56,824 1/s, Angle: 93,729 deg
Period: 0,111 s, Frequency: 9,025 Hz
Damping: 3,696 1/s, Ratio of Amplitudes: 1,506
Min. contribution: 0,100

Mode 1875: Participation



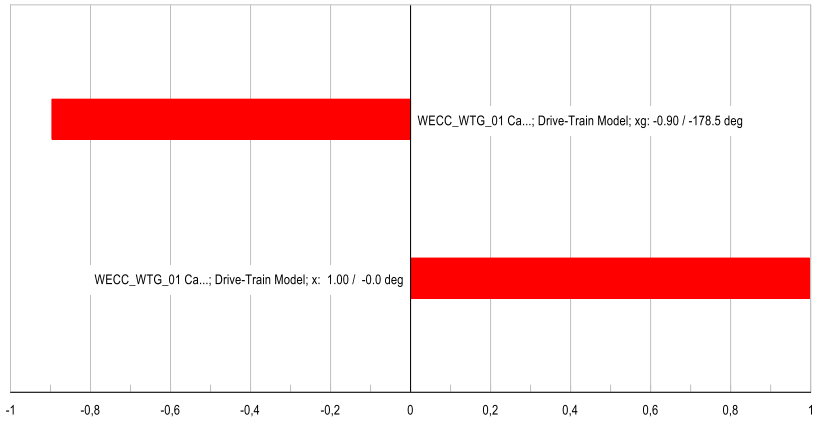
Eigenvalue of mode: -0,887 +12,536*j
Magnitude: 12,567 1/s, Angle: 94,048 deg
Period: 0,501 s, Frequency: 1,995 Hz
Damping: 0,887 1/s, Ratio of Amplitudes: 1,560
Min. contribution: 0,100

Mode 1723: Participation

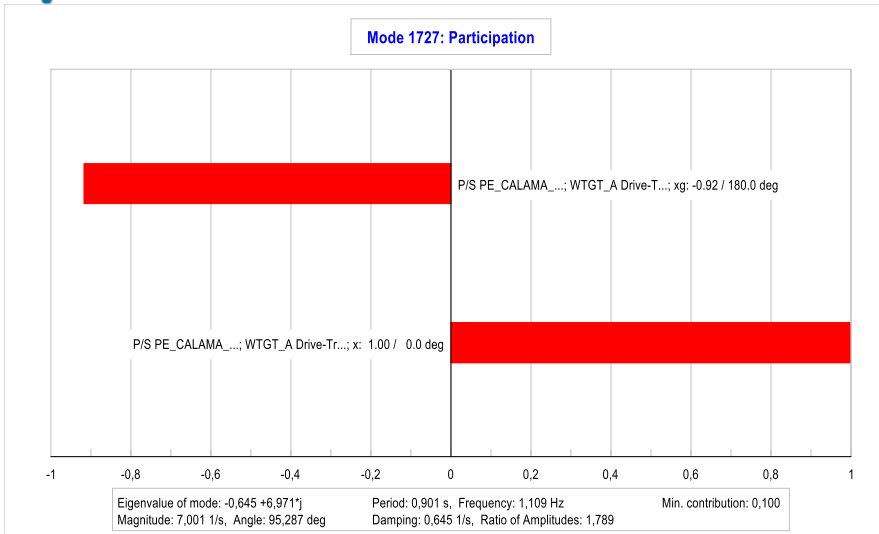


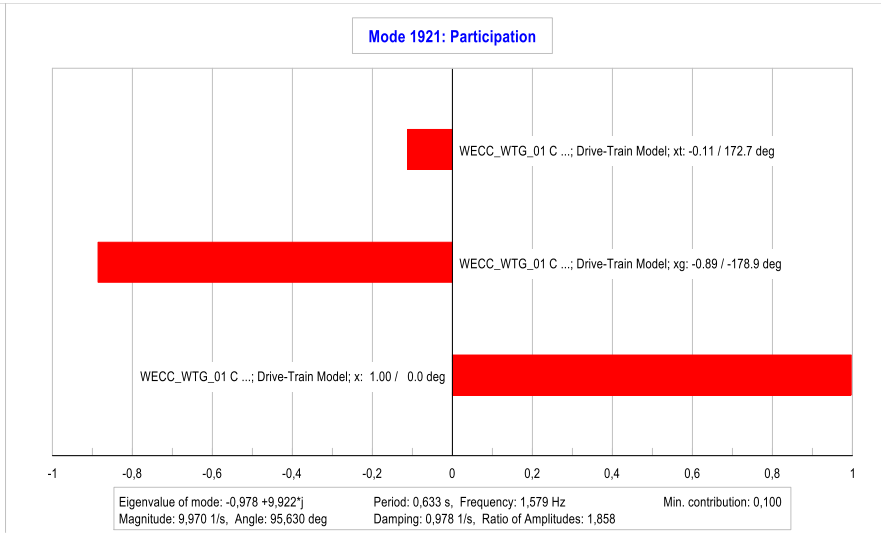
Eigenvalue of mode: -0,632 +8,028*j
Magnitude: 8,053 1/s, Angle: 94,503 deg
Period: 0,783 s, Frequency: 1,278 Hz
Damping: 0,632 1/s, Ratio of Amplitudes: 1,640
Min. contribution: 0,100

Mode 1888: Participation

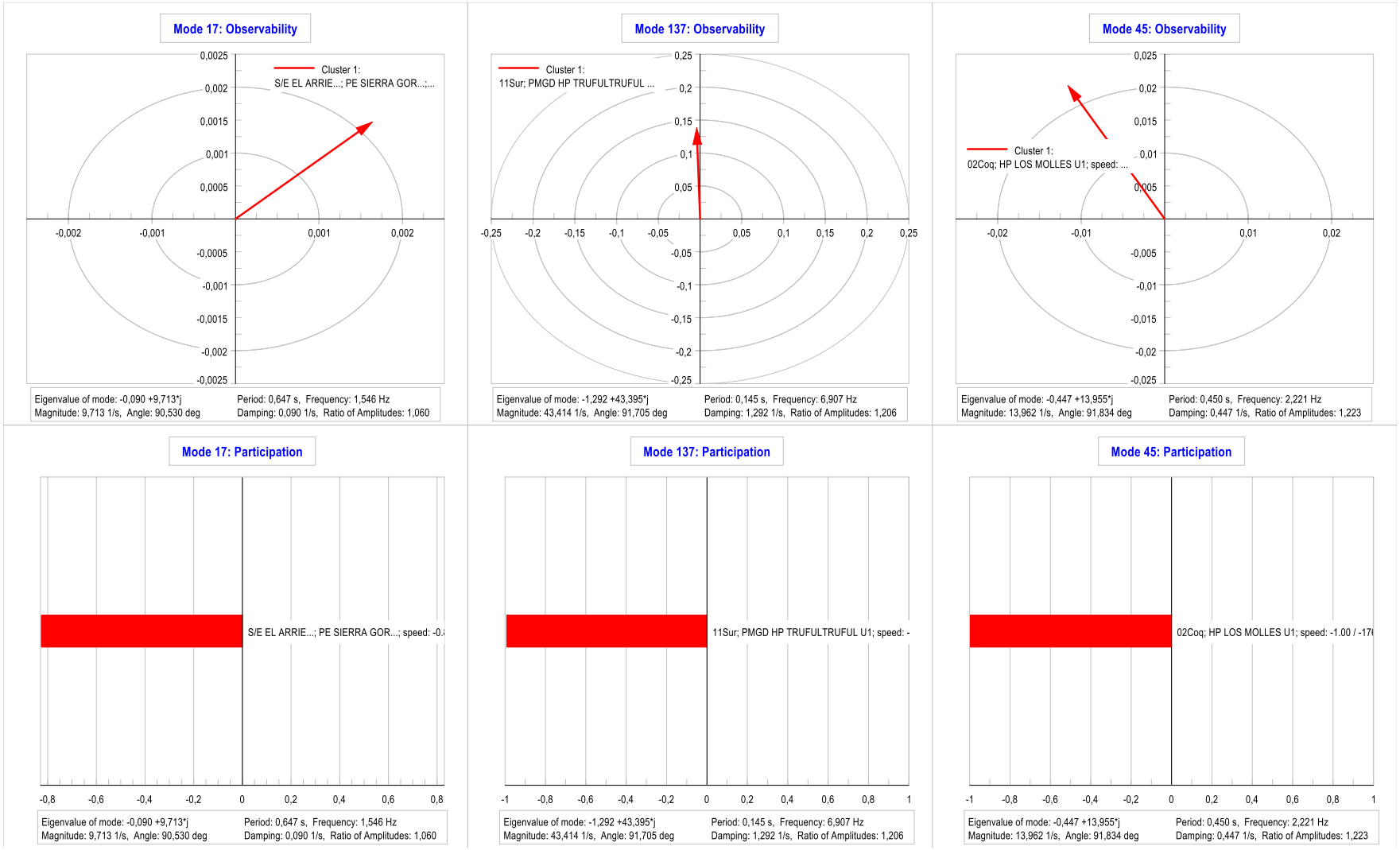


Eigenvalue of mode: -0,905 +9,912*j
Magnitude: 9,954 1/s, Angle: 95,217 deg
Period: 0,634 s, Frequency: 1,578 Hz
Damping: 0,905 1/s, Ratio of Amplitudes: 1,775
Min. contribution: 0,100

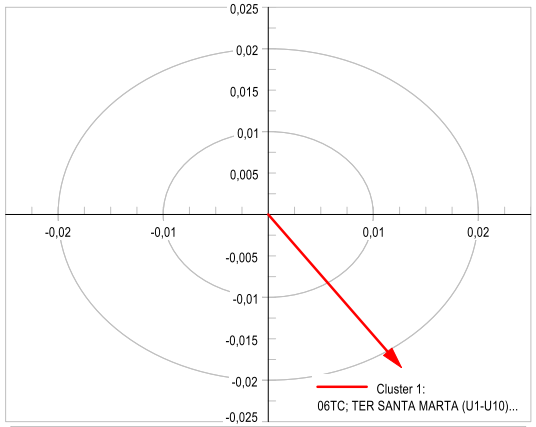

Mode 1727: Participation
P/S PE_CALAMA_...; WTGT_A Drive-T...; xg: -0.92 / 180.0 deg
P/S PE_CALAMA_...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,645 +6,971*j
Magnitude: 7,001 1/s, Angle: 95,287 deg
Period: 0,901 s, Frequency: 1,109 Hz
Damping: 0,645 1/s, Ratio of Amplitudes: 1,789
Min. contribution: 0,100


Mode 1921: Participation
WECC_WTG_01 C ...; Drive-Train Model; xt: -0.11 / 172.7 deg
WECC_WTG_01 C ...; Drive-Train Model; xg: -0.89 / -178.9 deg
WECC_WTG_01 C ...; Drive-Train Model; x: 1.00 / 0.0 deg
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,978 +9,922*j
Magnitude: 9,970 1/s, Angle: 95,630 deg
Period: 0,633 s, Frequency: 1,579 Hz
Damping: 0,978 1/s, Ratio of Amplitudes: 1,858
Min. contribution: 0,100

15.1.2 Red N-1 Caso 1.- Changos Cumbres 500 kV

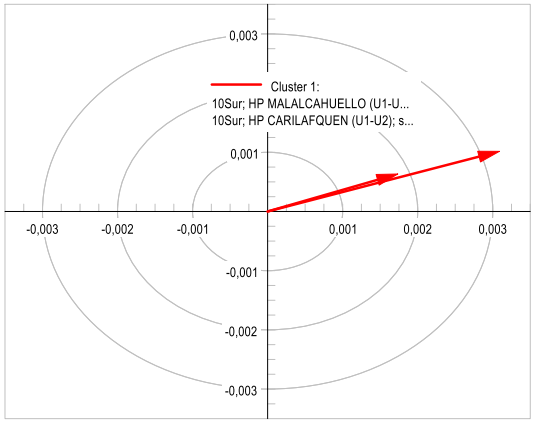


Mode 35: Observability



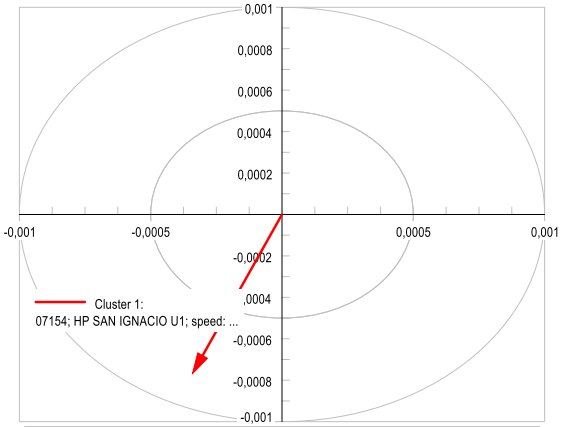
Eigenvalue of mode: -0,271 +7,045*j
Magnitude: 7,051 1/s, Angle: 92,206 deg
Period: 0,892 s, Frequency: 1,121 Hz
Damping: 0,271 1/s, Ratio of Amplitudes: 1,274

Mode 29: Observability



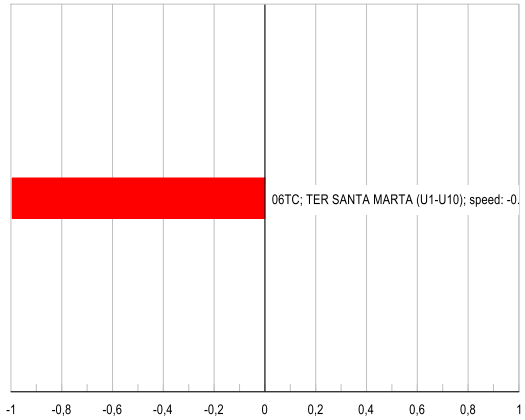
Eigenvalue of mode: -0,256 +5,432*j
Magnitude: 5,438 1/s, Angle: 92,698 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,256 1/s, Ratio of Amplitudes: 1,345

Mode 47: Observability



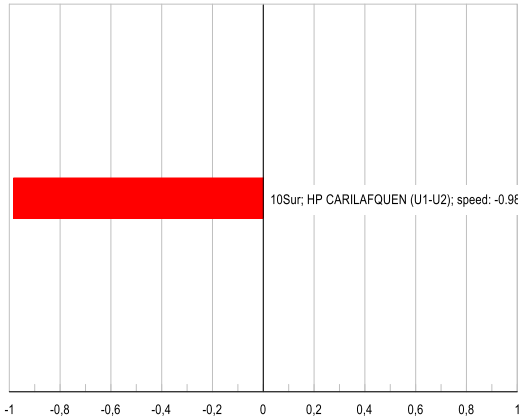
Eigenvalue of mode: -0,450 +8,693*j
Magnitude: 8,704 1/s, Angle: 92,965 deg
Period: 0,723 s, Frequency: 1,383 Hz
Damping: 0,450 1/s, Ratio of Amplitudes: 1,385

Mode 35: Participation



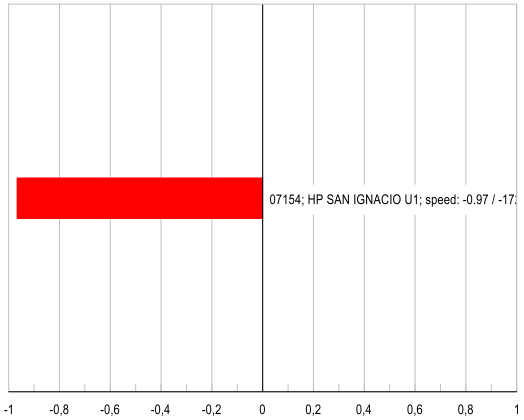
Eigenvalue of mode: -0,271 +7,045*j
Magnitude: 7,051 1/s, Angle: 92,206 deg
Period: 0,892 s, Frequency: 1,121 Hz
Damping: 0,271 1/s, Ratio of Amplitudes: 1,274

Mode 29: Participation



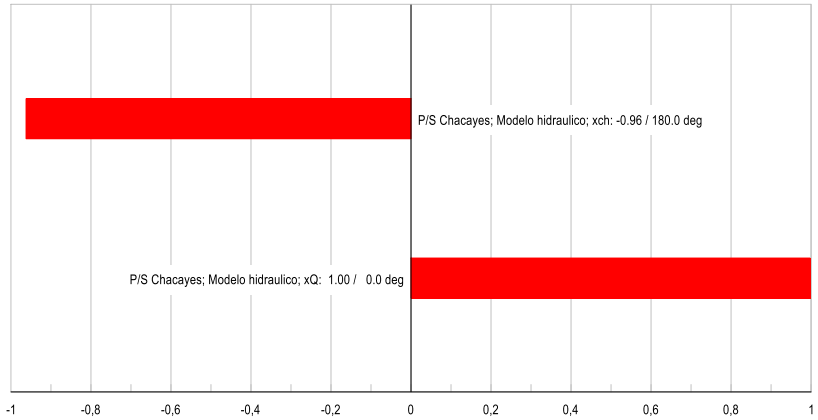
Eigenvalue of mode: -0,256 +5,432*j
Magnitude: 5,438 1/s, Angle: 92,698 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,256 1/s, Ratio of Amplitudes: 1,345

Mode 47: Participation



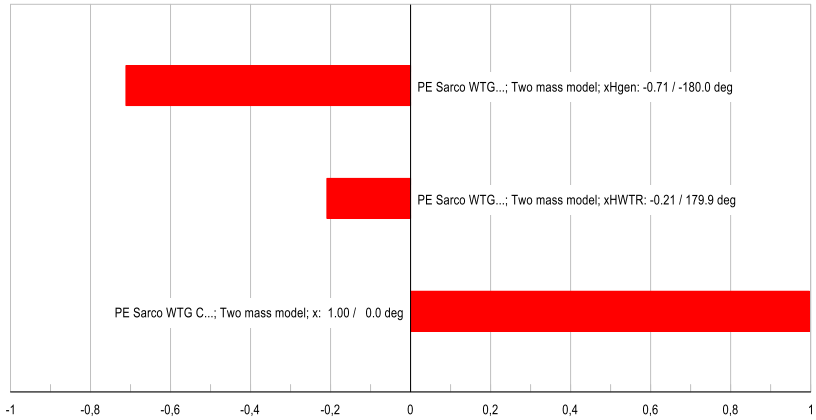
Eigenvalue of mode: -0,450 +8,693*j
Magnitude: 8,704 1/s, Angle: 92,965 deg
Period: 0,723 s, Frequency: 1,383 Hz
Damping: 0,450 1/s, Ratio of Amplitudes: 1,385

Mode 15: Participation



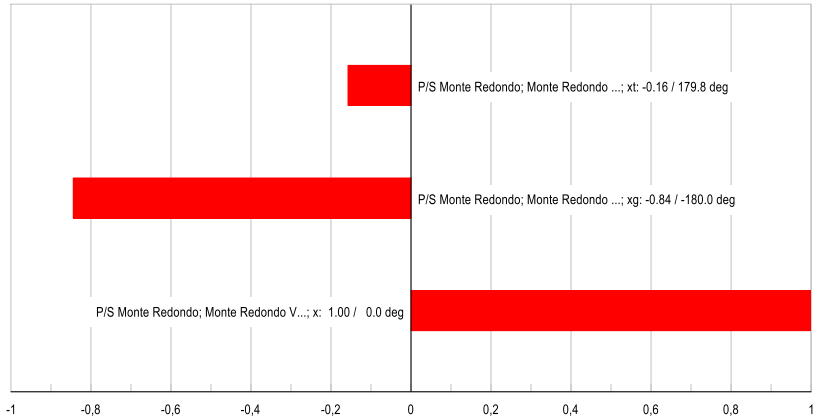
Eigenvalue of mode: -0,001 +0,044*j Period: 142,274 s, Frequency: 0,007 Hz Min. contribution: 0,100
Magnitude: 0,044 1/s, Angle: 91,237 deg Damping: 0,001 1/s, Ratio of Amplitudes: 1,145

Mode 25: Participation



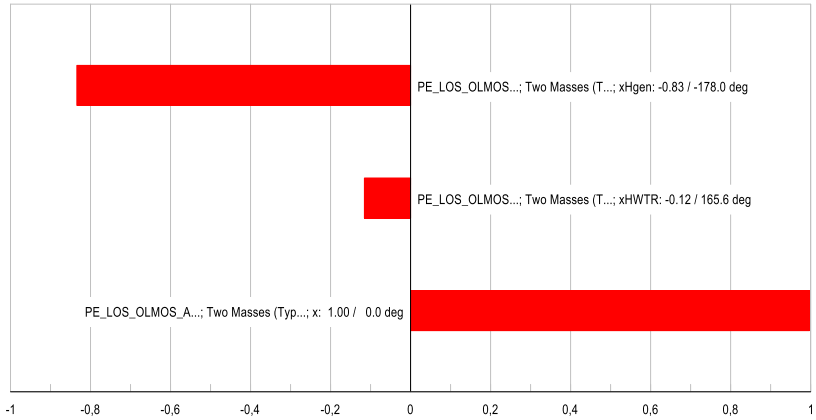
Eigenvalue of mode: -0,214 +8,595*j Period: 0,731 s, Frequency: 1,368 Hz Min. contribution: 0,100
Magnitude: 8,597 1/s, Angle: 91,428 deg Damping: 0,214 1/s, Ratio of Amplitudes: 1,170

Mode 33: Participation

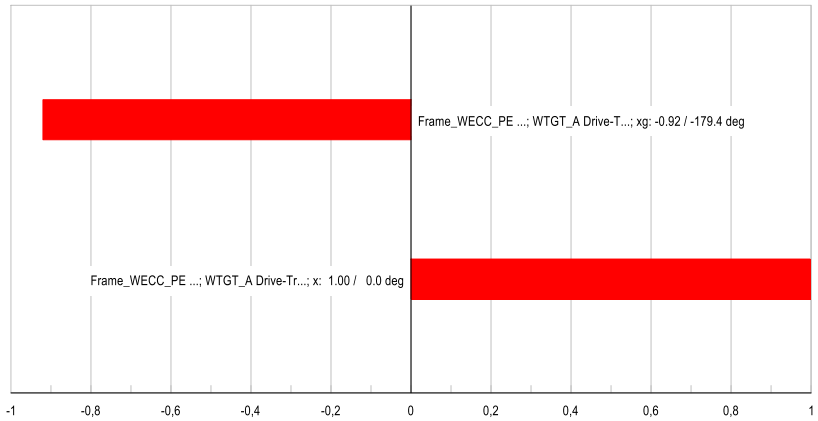


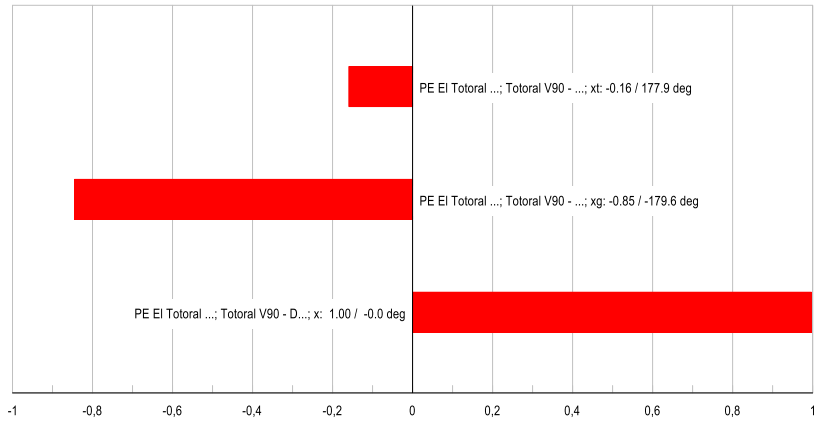
Eigenvalue of mode: -0,268 +9,739*j Period: 0,645 s, Frequency: 1,550 Hz Min. contribution: 0,100
Magnitude: 9,743 1/s, Angle: 91,577 deg Damping: 0,268 1/s, Ratio of Amplitudes: 1,189

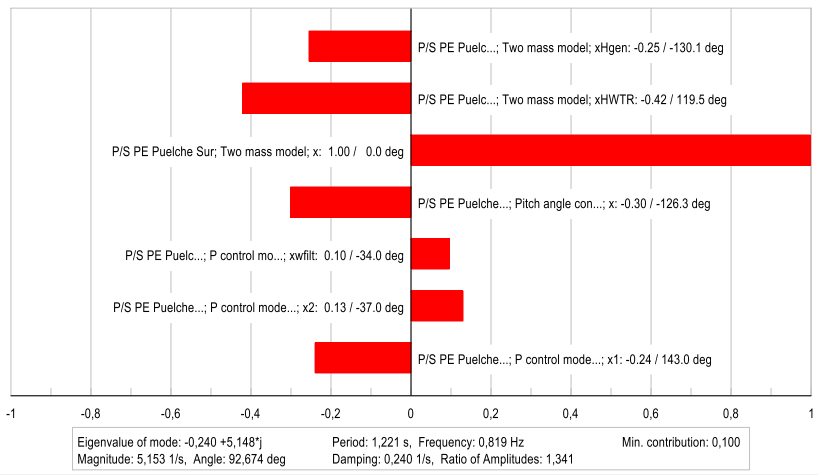
Mode 23: Participation

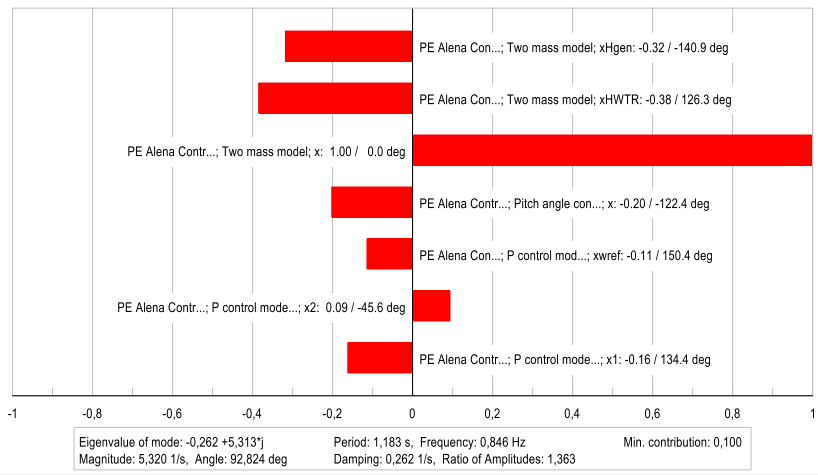


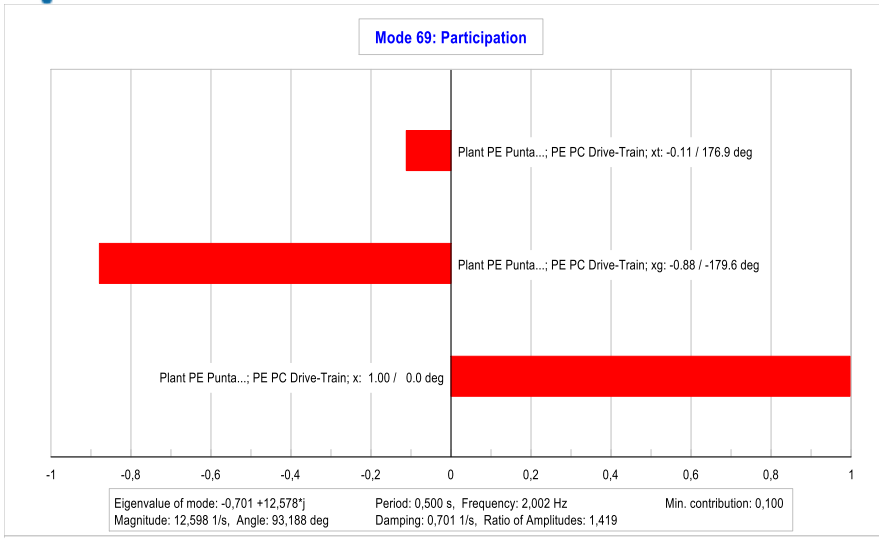
Eigenvalue of mode: -0,213 +6,855*j Period: 0,917 s, Frequency: 1,091 Hz Min. contribution: 0,100
Magnitude: 6,858 1/s, Angle: 91,779 deg Damping: 0,213 1/s, Ratio of Amplitudes: 1,216


Mode 41: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.4 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,375 +9,057*j
Magnitude: 9,065 1/s, Angle: 92,372 deg
Period: 0,694 s, Frequency: 1,442 Hz
Damping: 0,375 1/s, Ratio of Amplitudes: 1,297
Min. contribution: 0,100

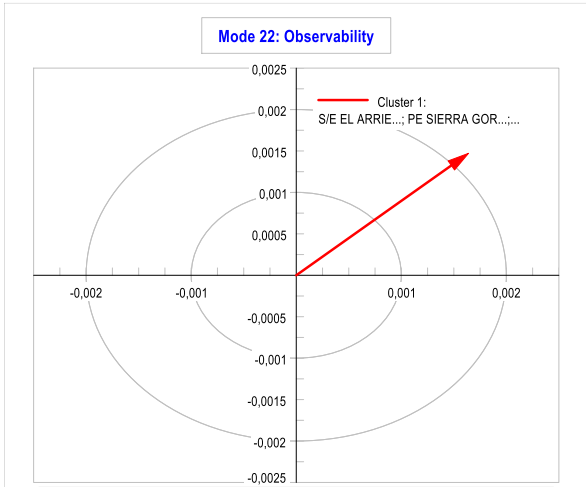

Mode 43: Participation
PE El Totoral ...; Totoral V90 - ...; xt: -0.16 / 177.9 deg
PE El Totoral ...; Totoral V90 - ...; xg: -0.85 / -179.6 deg
PE El Totoral ...; Totoral V90 - D...; x: 1.00 / -0.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,441 +9,745*j
Magnitude: 9,755 1/s, Angle: 92,592 deg
Period: 0,645 s, Frequency: 1,551 Hz
Damping: 0,441 1/s, Ratio of Amplitudes: 1,329
Min. contribution: 0,100

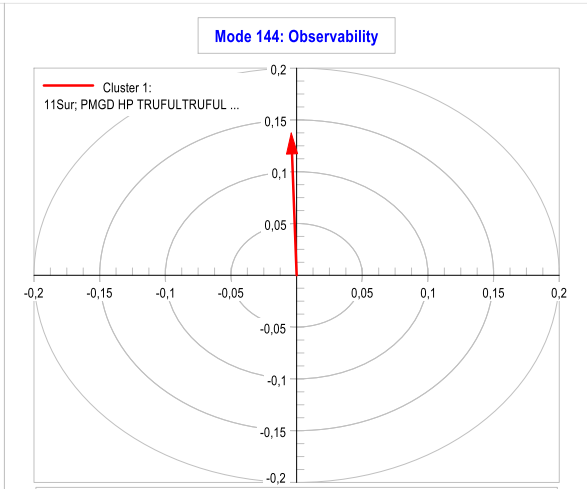

Mode 27: Participation
P/S PE Puelc...; Two mass model; xHgen: -0.25 / -130.1 deg
P/S PE Puelc...; Two mass model; xHWTR: -0.42 / 119.5 deg
P/S PE Puelche Sur; Two mass model; x: 1.00 / 0.0 deg
P/S PE Puelche...; Pitch angle con...; x: -0.30 / -126.3 deg
P/S PE Puelc...; P control mo...; xwfilt: 0.10 / -34.0 deg
P/S PE Puelche...; P control mode...; x2: 0.13 / -37.0 deg
P/S PE Puelche...; P control mode...; x1: -0.24 / 143.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,240 +5,148*j
Magnitude: 5,153 1/s, Angle: 92,674 deg
Period: 1,221 s, Frequency: 0,819 Hz
Damping: 0,240 1/s, Ratio of Amplitudes: 1,341
Min. contribution: 0,100

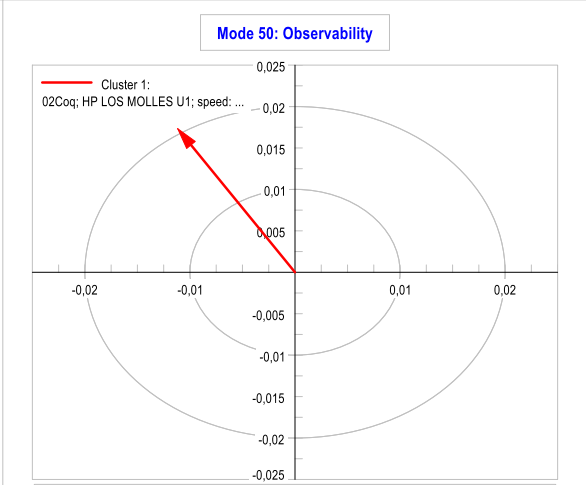

Mode 31: Participation
PE Alena Con...; Two mass model; xHgen: -0.32 / -140.9 deg
PE Alena Con...; Two mass model; xHWTR: -0.38 / 126.3 deg
PE Alena Contr...; Two mass model; x: 1.00 / 0.0 deg
PE Alena Contr...; Pitch angle con...; x: -0.20 / -122.4 deg
PE Alena Con...; P control mod...; xwref: -0.11 / 150.4 deg
PE Alena Contr...; P control mode...; x2: 0.09 / -45.6 deg
PE Alena Contr...; P control mode...; x1: -0.16 / 134.4 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,262 +5,313*j
Magnitude: 5,320 1/s, Angle: 92,824 deg
Period: 1,183 s, Frequency: 0,846 Hz
Damping: 0,262 1/s, Ratio of Amplitudes: 1,363
Min. contribution: 0,100

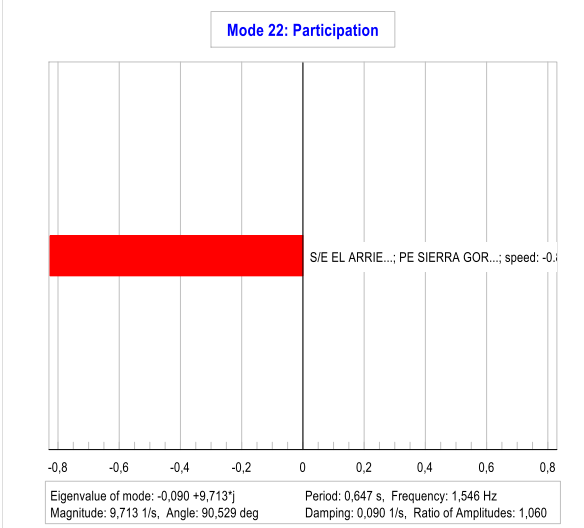

Mode 69: Participation
Plant PE Punta...; PE PC Drive-Train; xt: -0.11 / 176.9 deg
Plant PE Punta...; PE PC Drive-Train; xg: -0.88 / -179.6 deg
Plant PE Punta...; PE PC Drive-Train; x: 1.00 / 0.0 deg
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,701 +12,578*j
Magnitude: 12,598 1/s, Angle: 93,188 deg
Period: 0,500 s, Frequency: 2,002 Hz
Damping: 0,701 1/s, Ratio of Amplitudes: 1,419
Min. contribution: 0,100

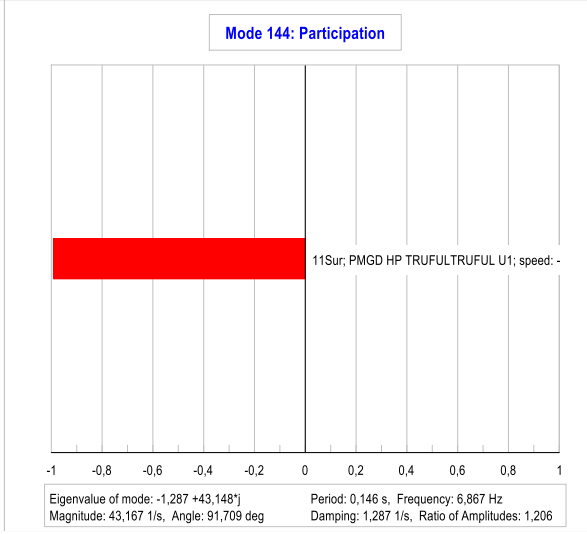
15.1.3 Red N-1 Caso 2.- Nueva Pan de Azúcar - Polpaico 500kV

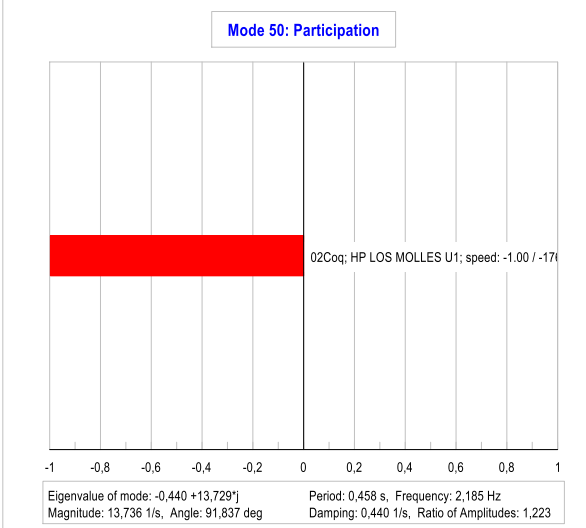




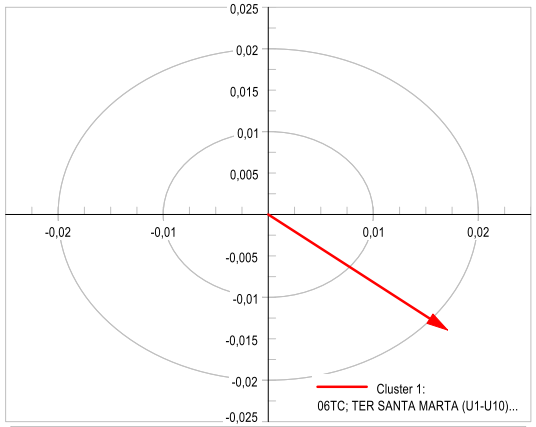






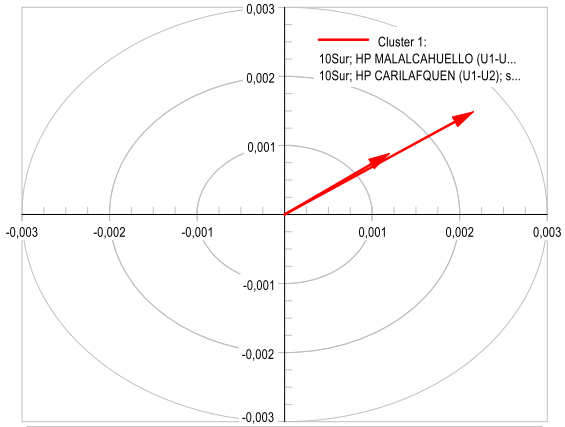


Mode 38: Observability



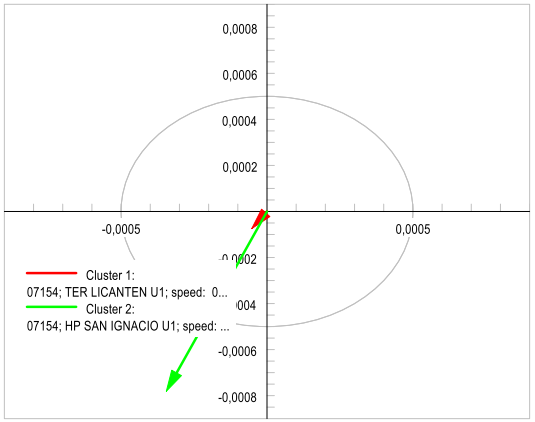
Eigenvalue of mode: -0,264 +6,929*j
Magnitude: 6,934 1/s, Angle: 92,185 deg
Period: 0,907 s, Frequency: 1,103 Hz
Damping: 0,264 1/s, Ratio of Amplitudes: 1,271

Mode 34: Observability



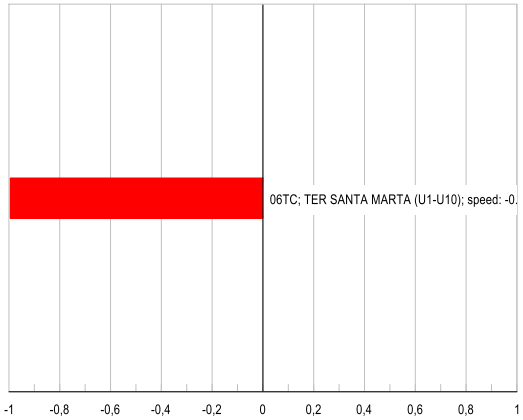
Eigenvalue of mode: -0,254 +5,432*j
Magnitude: 5,438 1/s, Angle: 92,673 deg
Period: 1,157 s, Frequency: 0,865 Hz
Damping: 0,254 1/s, Ratio of Amplitudes: 1,341

Mode 48: Observability



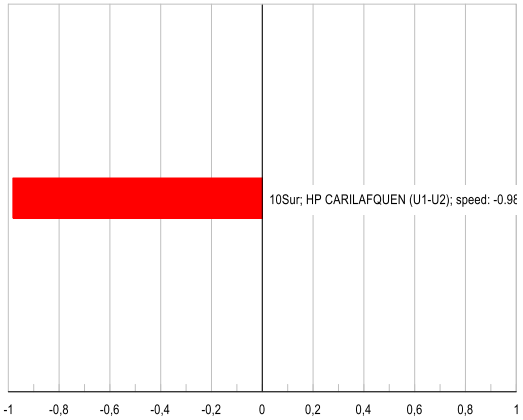
Eigenvalue of mode: -0,432 +8,778*j
Magnitude: 8,789 1/s, Angle: 92,817 deg
Period: 0,716 s, Frequency: 1,397 Hz
Damping: 0,432 1/s, Ratio of Amplitudes: 1,362

Mode 38: Participation



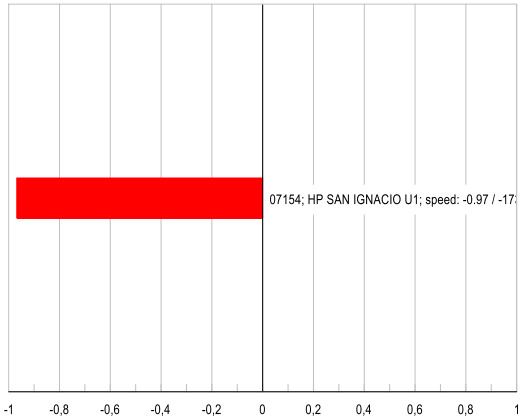
Eigenvalue of mode: -0,264 +6,929*j
Magnitude: 6,934 1/s, Angle: 92,185 deg
Period: 0,907 s, Frequency: 1,103 Hz
Damping: 0,264 1/s, Ratio of Amplitudes: 1,271

Mode 34: Participation



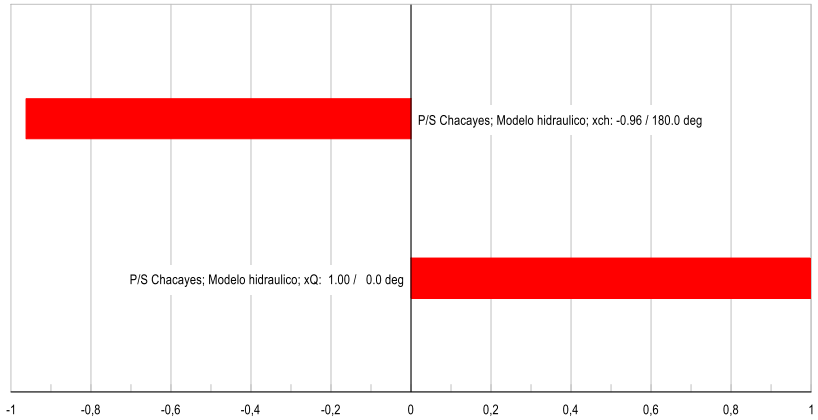
Eigenvalue of mode: -0,254 +5,432*j
Magnitude: 5,438 1/s, Angle: 92,673 deg
Period: 1,157 s, Frequency: 0,865 Hz
Damping: 0,254 1/s, Ratio of Amplitudes: 1,341

Mode 48: Participation



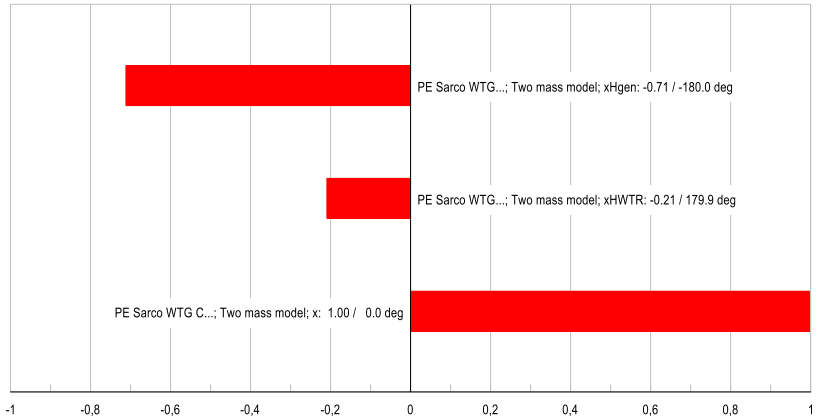
Eigenvalue of mode: -0,432 +8,778*j
Magnitude: 8,789 1/s, Angle: 92,817 deg
Period: 0,716 s, Frequency: 1,397 Hz
Damping: 0,432 1/s, Ratio of Amplitudes: 1,362

Mode 20: Participation



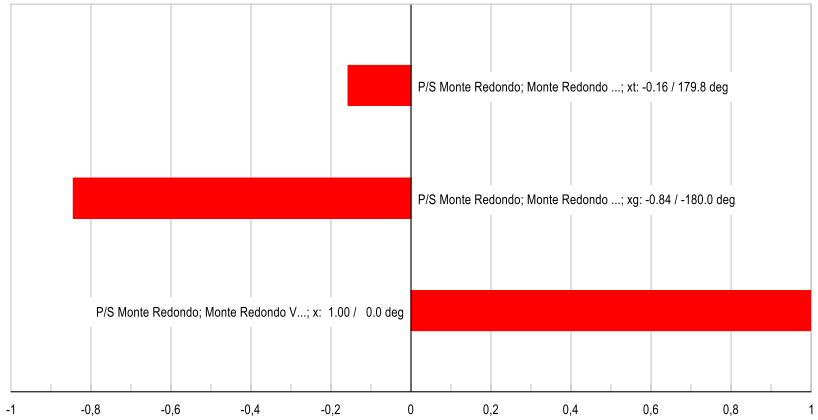
Eigenvalue of mode: -0,001 +0,044*j Period: 142,274 s, Frequency: 0,007 Hz Min. contribution: 0,100
Magnitude: 0,044 1/s, Angle: 91,236 deg Damping: 0,001 1/s, Ratio of Amplitudes: 1,145

Mode 30: Participation



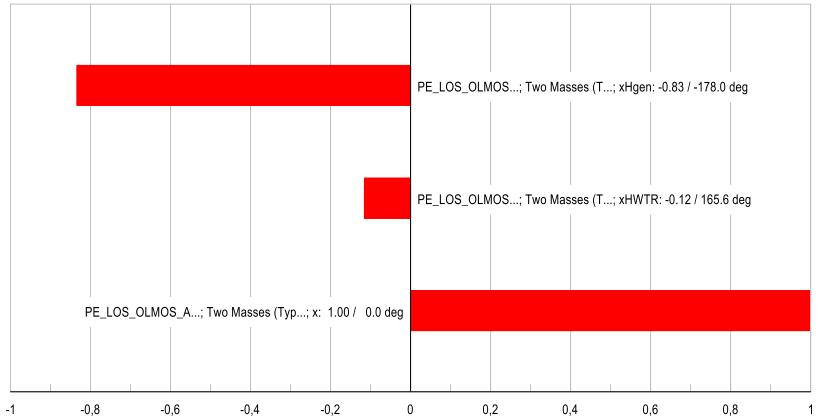
Eigenvalue of mode: -0,214 +8,595*j Period: 0,731 s, Frequency: 1,368 Hz Min. contribution: 0,100
Magnitude: 8,597 1/s, Angle: 91,429 deg Damping: 0,214 1/s, Ratio of Amplitudes: 1,170

Mode 40: Participation

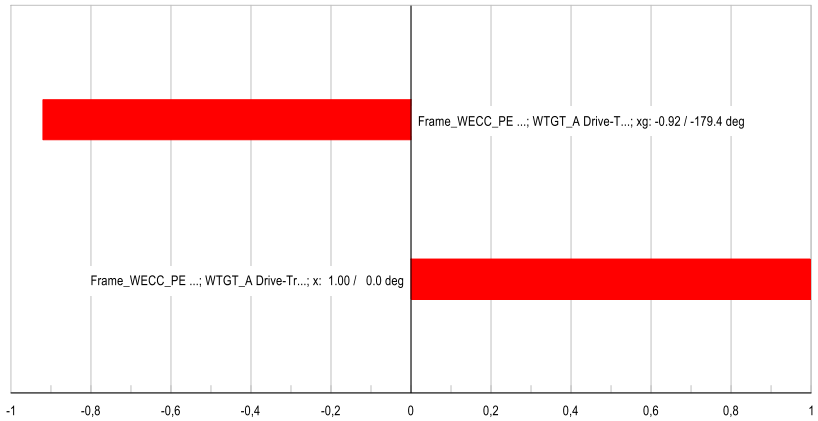


Eigenvalue of mode: -0,268 +9,739*j Period: 0,645 s, Frequency: 1,550 Hz Min. contribution: 0,100
Magnitude: 9,743 1/s, Angle: 91,578 deg Damping: 0,268 1/s, Ratio of Amplitudes: 1,189

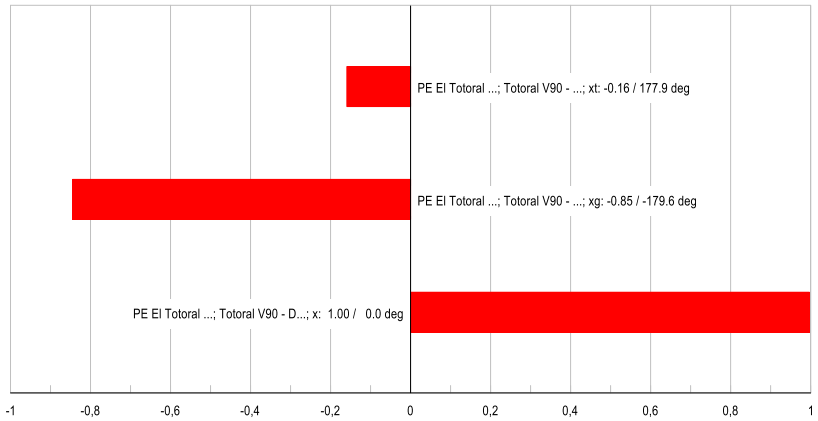
Mode 28: Participation



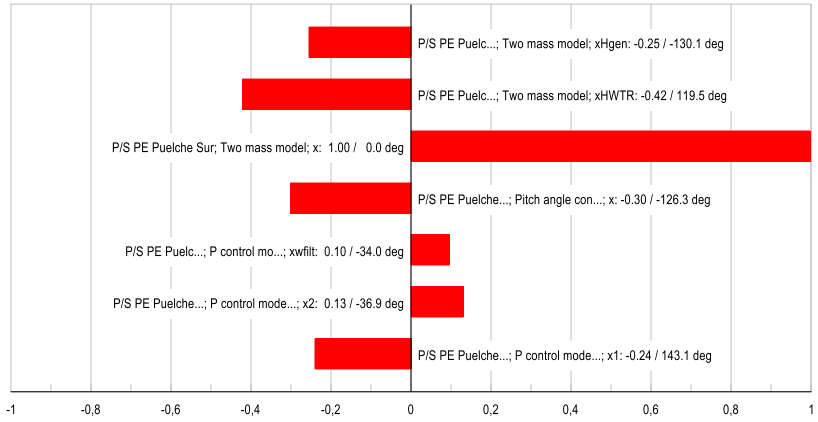
Eigenvalue of mode: -0,213 +6,855*j Period: 0,917 s, Frequency: 1,091 Hz Min. contribution: 0,100
Magnitude: 6,858 1/s, Angle: 91,780 deg Damping: 0,213 1/s, Ratio of Amplitudes: 1,216



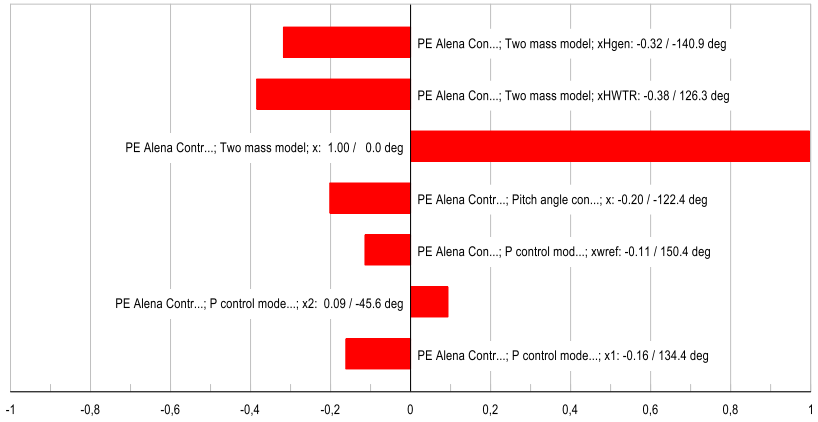
Eigenvalue of mode: -0,375 +9,057*j Period: 0,694 s, Frequency: 1,442 Hz Min. contribution: 0,100
Magnitude: 9,065 1/s, Angle: 92,372 deg Damping: 0,375 1/s, Ratio of Amplitudes: 1,297



Eigenvalue of mode: -0,441 +9,745*j Period: 0,645 s, Frequency: 1,551 Hz Min. contribution: 0,100
Magnitude: 9,755 1/s, Angle: 92,592 deg Damping: 0,441 1/s, Ratio of Amplitudes: 1,329

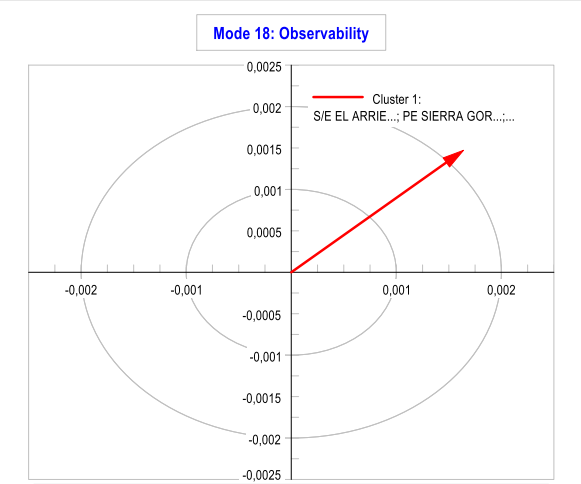


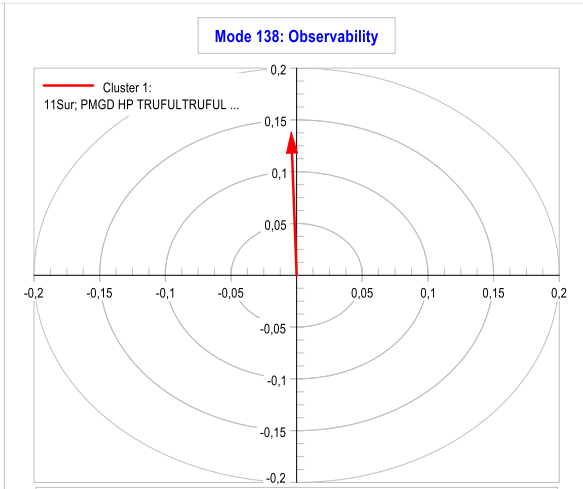
Eigenvalue of mode: -0,241 +5,147*j Period: 1,221 s, Frequency: 0,819 Hz Min. contribution: 0,100
Magnitude: 5,153 1/s, Angle: 92,681 deg Damping: 0,241 1/s, Ratio of Amplitudes: 1,342

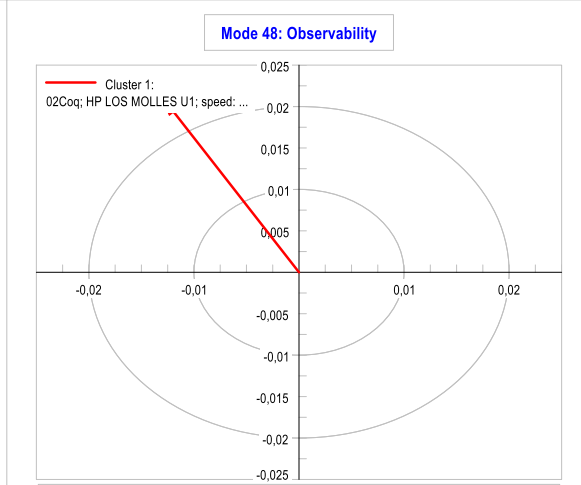


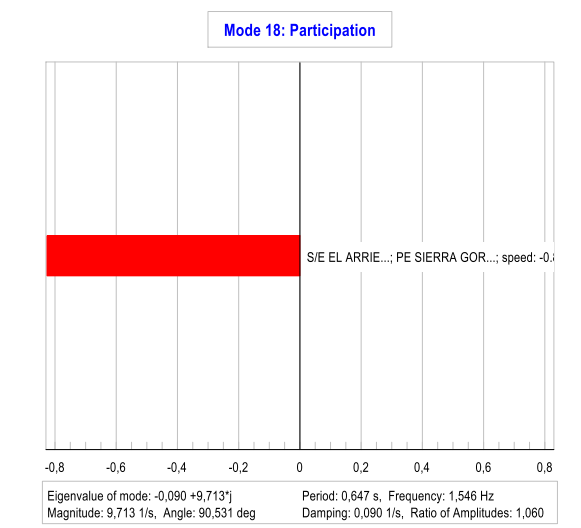
Eigenvalue of mode: -0,262 +5,313*j Period: 1,183 s, Frequency: 0,846 Hz Min. contribution: 0,100
Magnitude: 5,320 1/s, Angle: 92,826 deg Damping: 0,262 1/s, Ratio of Amplitudes: 1,364

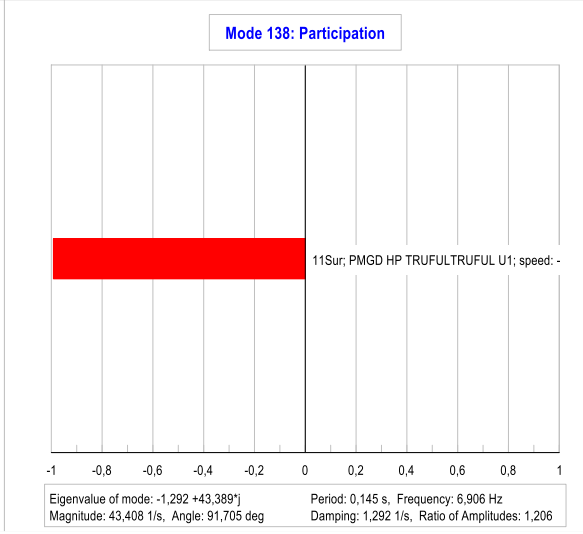
15.1.4 Red N-1 Caso 3.- Charrúa - Ancoa 500kV

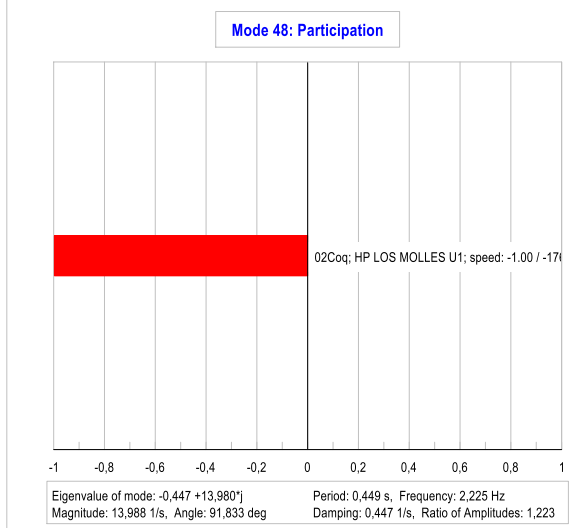


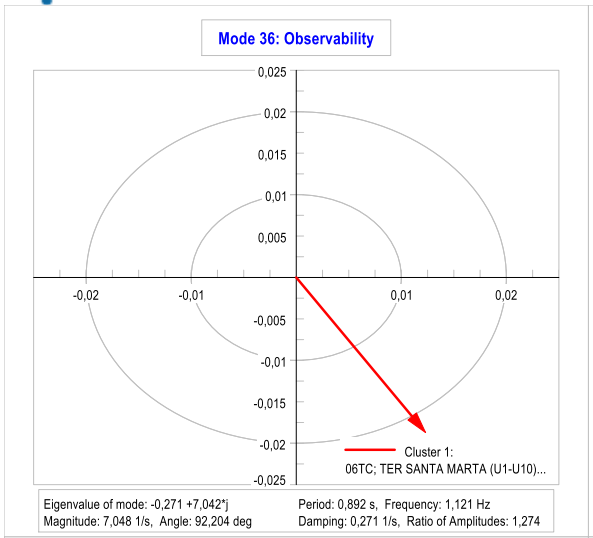


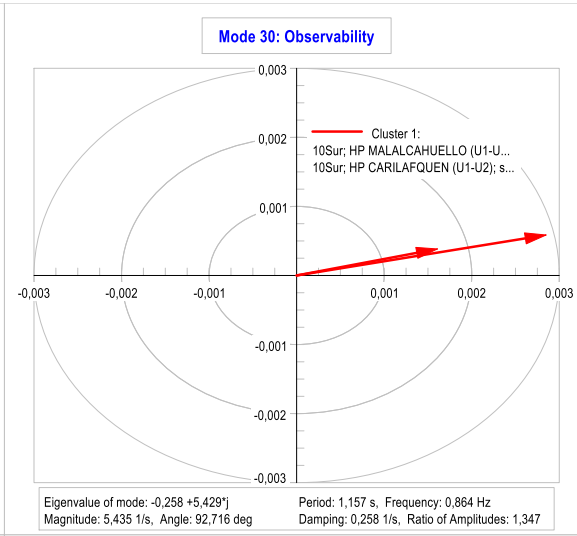


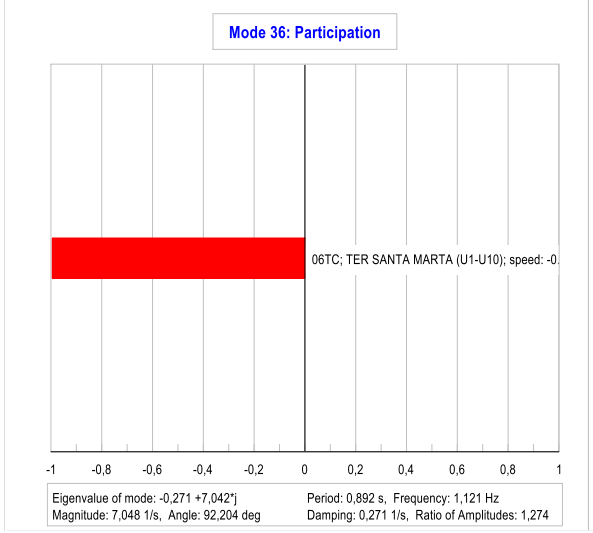


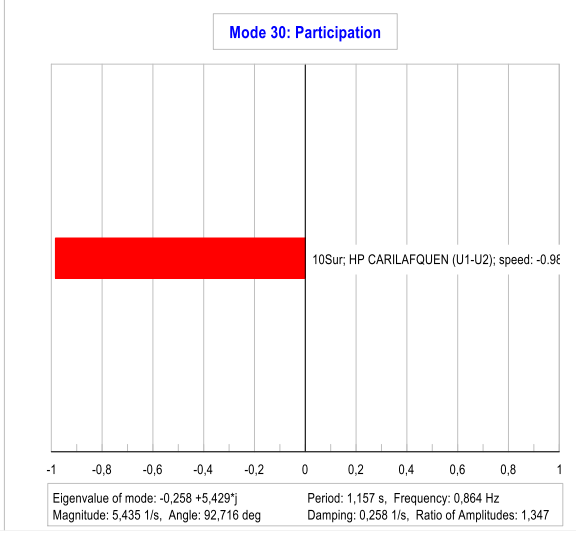




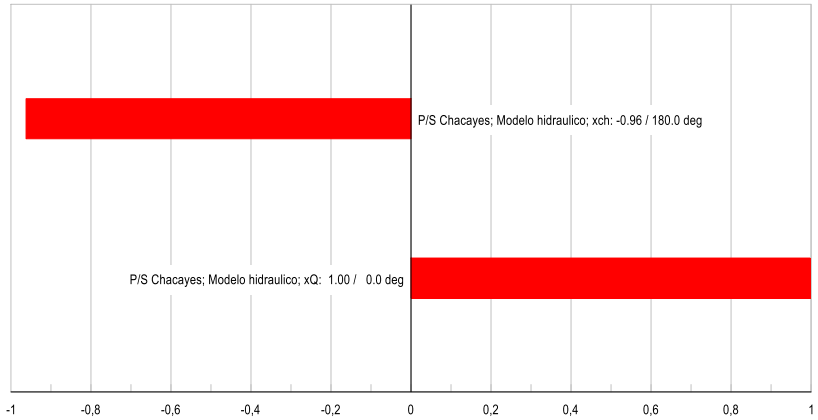

Mode 36: Observability
0,025
0,02
0,015
0,01
0,005
-0,02
-0,01
0,01
0,02
-0,005
-0,01
-0,015
-0,02
-0,025
Cluster 1:
06TC; TER SANTA MARTA (U1-U10)...
Eigenvalue of mode: -0,271 +7,042*j
Magnitude: 7,048 1/s, Angle: 92,204 deg
Period: 0,892 s, Frequency: 1,121 Hz
Damping: 0,271 1/s, Ratio of Amplitudes: 1,274


Mode 30: Observability
0,003
0,002
0,001
-0,003
-0,002
-0,001
0,001
0,002
0,003
-0,001
-0,002
-0,003
Cluster 1:
10Sur; HP MALALCAHUELLO (U1-U...
10Sur; HP CARILAFQUEN (U1-U2); s...
Eigenvalue of mode: -0,258 +5,429*j
Magnitude: 5,435 1/s, Angle: 92,716 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,258 1/s, Ratio of Amplitudes: 1,347


Mode 36: Participation
06TC; TER SANTA MARTA (U1-U10); speed: -0.
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,271 +7,042*j
Magnitude: 7,048 1/s, Angle: 92,204 deg
Period: 0,892 s, Frequency: 1,121 Hz
Damping: 0,271 1/s, Ratio of Amplitudes: 1,274

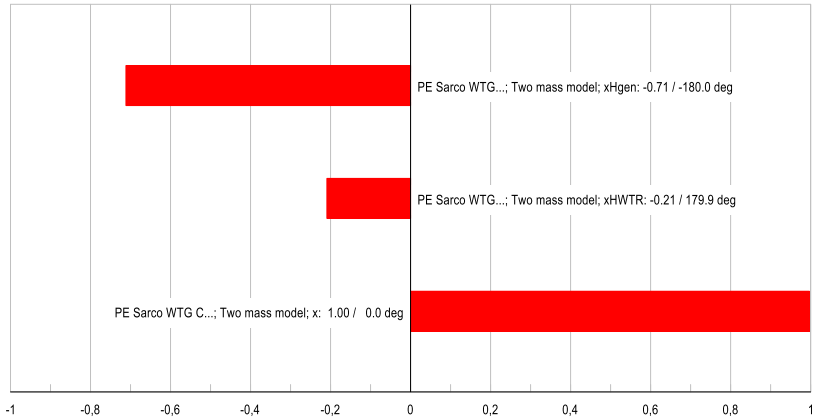

Mode 30: Participation
10Sur; HP CARILAFQUEN (U1-U2); speed: -0.98
-1
-0,8
-0,6
-0,4
-0,2
0
0,2
0,4
0,6
0,8
1
Eigenvalue of mode: -0,258 +5,429*j
Magnitude: 5,435 1/s, Angle: 92,716 deg
Period: 1,157 s, Frequency: 0,864 Hz
Damping: 0,258 1/s, Ratio of Amplitudes: 1,347

Mode 16: Participation



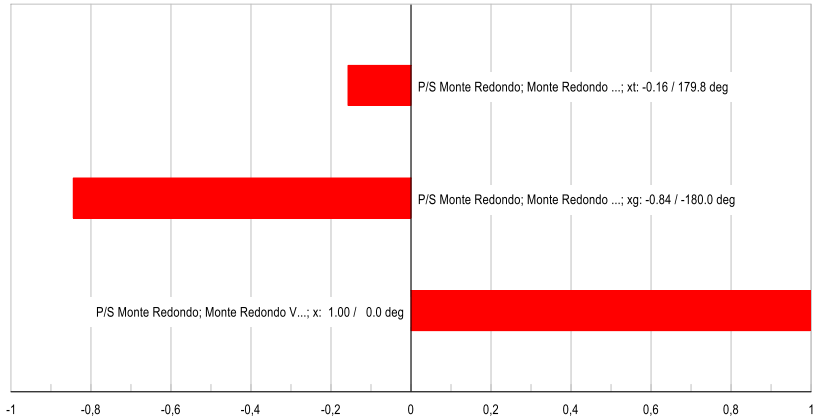
Eigenvalue of mode: -0,001 +0,044*j Period: 142,275 s, Frequency: 0,007 Hz Min. contribution: 0,100
Magnitude: 0,044 1/s, Angle: 91,237 deg Damping: 0,001 1/s, Ratio of Amplitudes: 1,145

Mode 26: Participation



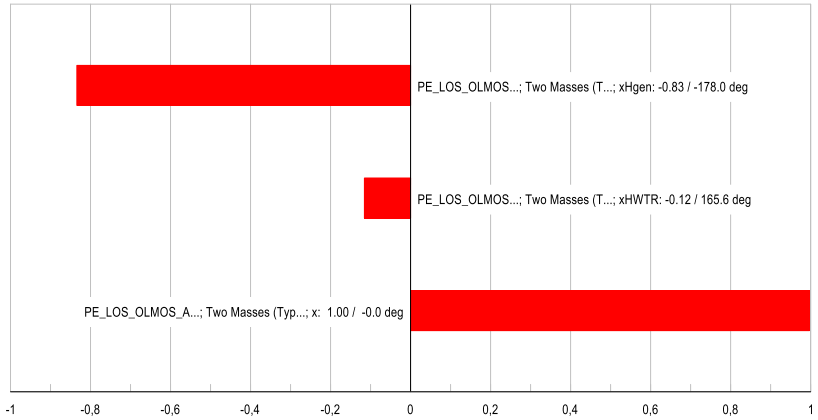
Eigenvalue of mode: -0,214 +8,595*j Period: 0,731 s, Frequency: 1,368 Hz Min. contribution: 0,100
Magnitude: 8,597 1/s, Angle: 91,429 deg Damping: 0,214 1/s, Ratio of Amplitudes: 1,170

Mode 34: Participation

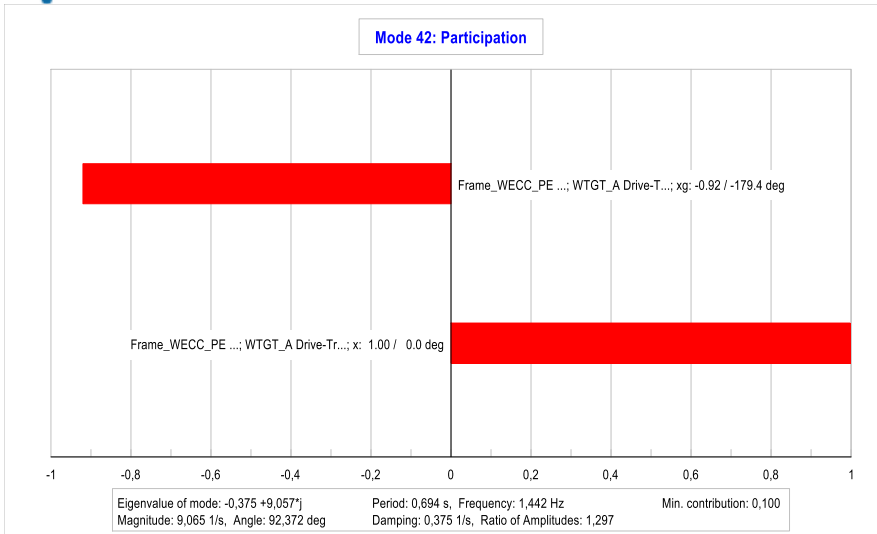


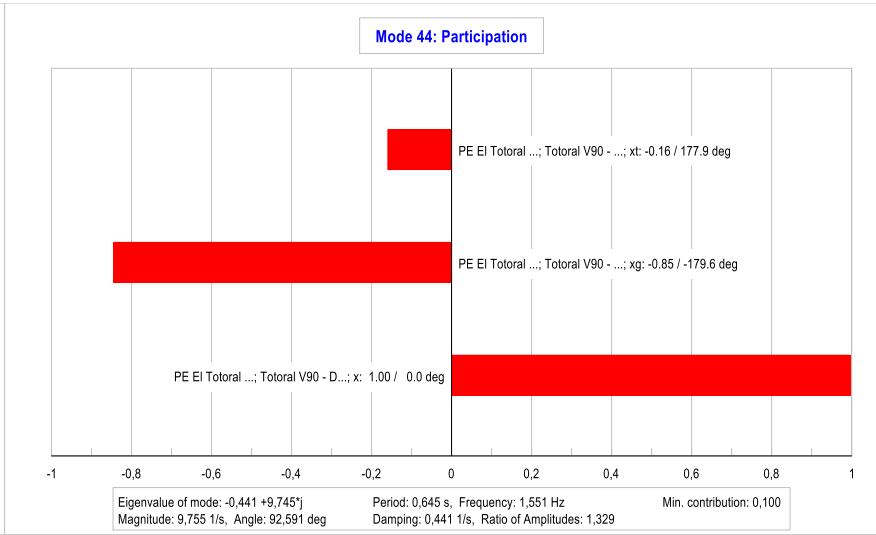
Eigenvalue of mode: -0,268 +9,739*j Period: 0,645 s, Frequency: 1,550 Hz Min. contribution: 0,100
Magnitude: 9,743 1/s, Angle: 91,577 deg Damping: 0,268 1/s, Ratio of Amplitudes: 1,189

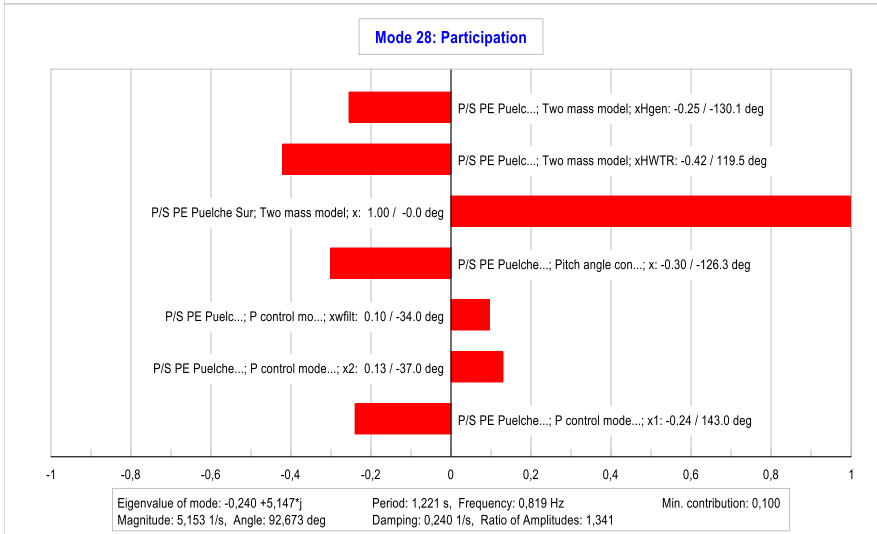
Mode 24: Participation

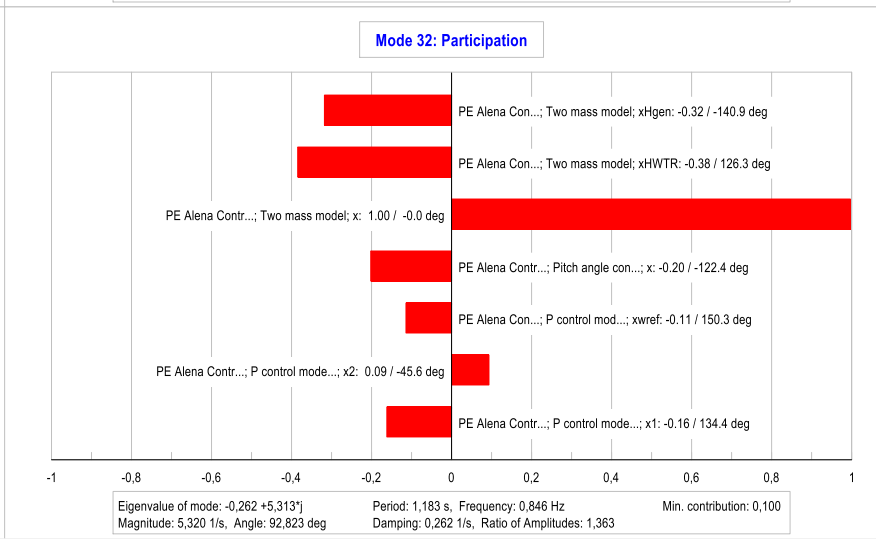


Eigenvalue of mode: -0,213 +6,855*j Period: 0,917 s, Frequency: 1,091 Hz Min. contribution: 0,100
Magnitude: 6,858 1/s, Angle: 91,780 deg Damping: 0,213 1/s, Ratio of Amplitudes: 1,216


Mode 42: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.4 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,375 +9,057*j
Magnitude: 9,065 1/s, Angle: 92,372 deg
Period: 0,694 s, Frequency: 1,442 Hz
Damping: 0,375 1/s, Ratio of Amplitudes: 1,297
Min. contribution: 0,100

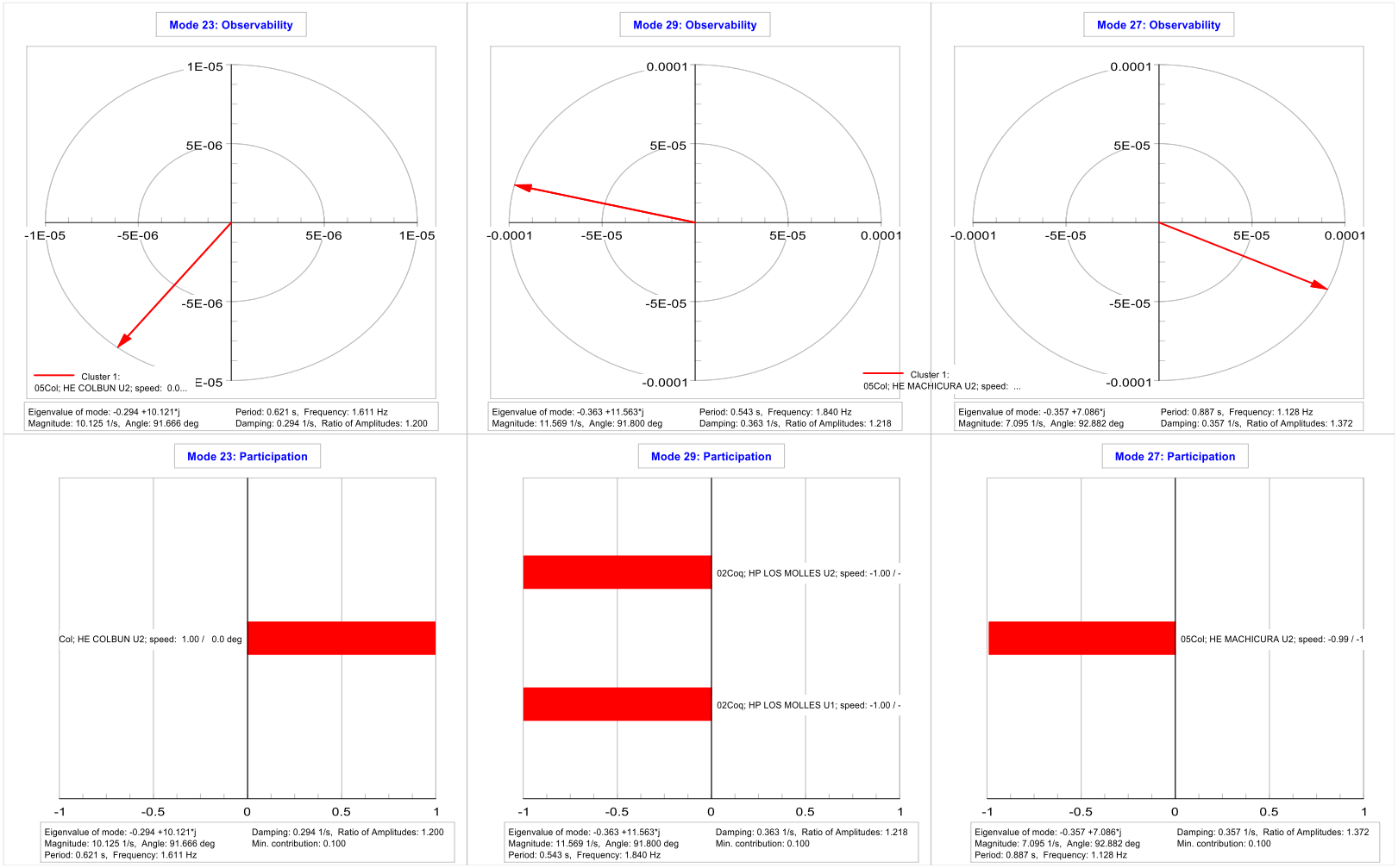

Mode 44: Participation
PE El Totoral ...; Totoral V90 - ...; xt: -0.16 / 177.9 deg
PE El Totoral ...; Totoral V90 - ...; xg: -0.85 / -179.6 deg
PE El Totoral ...; Totoral V90 - D...; x: 1.00 / 0.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,441 +9,745*j
Magnitude: 9,755 1/s, Angle: 92,591 deg
Period: 0,645 s, Frequency: 1,551 Hz
Damping: 0,441 1/s, Ratio of Amplitudes: 1,329
Min. contribution: 0,100


Mode 28: Participation
P/S PE Puelc...; Two mass model; xHgen: -0.25 / -130.1 deg
P/S PE Puelc...; Two mass model; xHWTR: -0.42 / 119.5 deg
P/S PE Puelche Sur; Two mass model; x: 1.00 / -0.0 deg
P/S PE Puelche...; Pitch angle con...; x: -0.30 / -126.3 deg
P/S PE Puelc...; P control mo...; xwfilt: 0.10 / -34.0 deg
P/S PE Puelche...; P control mode...; x2: 0.13 / -37.0 deg
P/S PE Puelche...; P control mode...; x1: -0.24 / 143.0 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,240 +5,147*j
Magnitude: 5,153 1/s, Angle: 92,673 deg
Period: 1,221 s, Frequency: 0,819 Hz
Damping: 0,240 1/s, Ratio of Amplitudes: 1,341
Min. contribution: 0,100

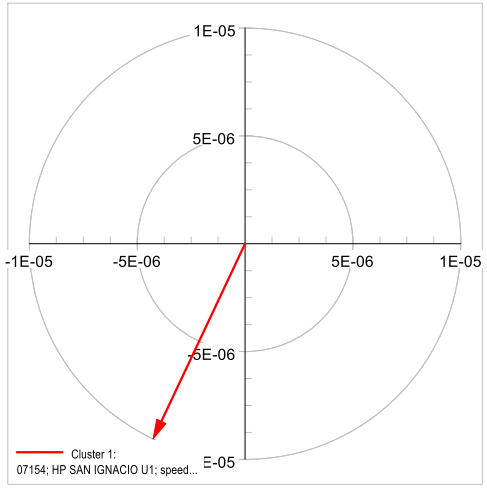

Mode 32: Participation
PE Alena Con...; Two mass model; xHgen: -0.32 / -140.9 deg
PE Alena Con...; Two mass model; xHWTR: -0.38 / 126.3 deg
PE Alena Contr...; Two mass model; x: 1.00 / -0.0 deg
PE Alena Contr...; Pitch angle con...; x: -0.20 / -122.4 deg
PE Alena Con...; P control mod...; xwref: -0.11 / 150.3 deg
PE Alena Contr...; P control mode...; x2: 0.09 / -45.6 deg
PE Alena Contr...; P control mode...; x1: -0.16 / 134.4 deg
-1 -0,8 -0,6 -0,4 -0,2 0 0,2 0,4 0,6 0,8 1
Eigenvalue of mode: -0,262 +5,313*j
Magnitude: 5,320 1/s, Angle: 92,823 deg
Period: 1,183 s, Frequency: 0,846 Hz
Damping: 0,262 1/s, Ratio of Amplitudes: 1,363
Min. contribution: 0,100

15.2 Escenario E2 DA noche Dic2024

15.2.1 Red N

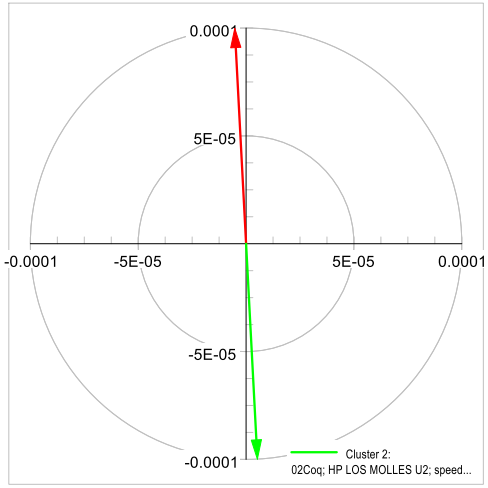


Mode 45: Observability



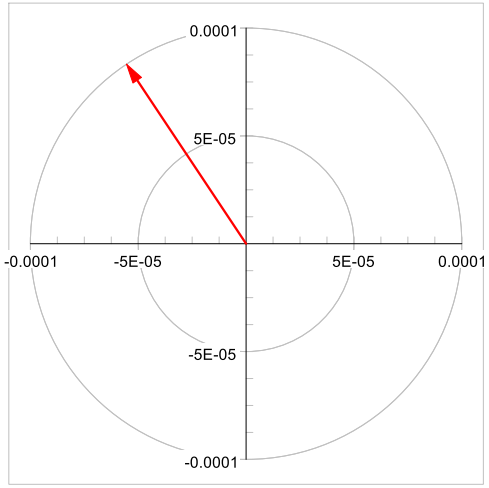
Eigenvalue of mode: -0.462 +8.962*j
Magnitude: 8.974 1/s, Angle: 92.950 deg
Period: 0.701 s, Frequency: 1.426 Hz
Damping: 0.462 1/s, Ratio of Amplitudes: 1.382

Mode 117: Observability



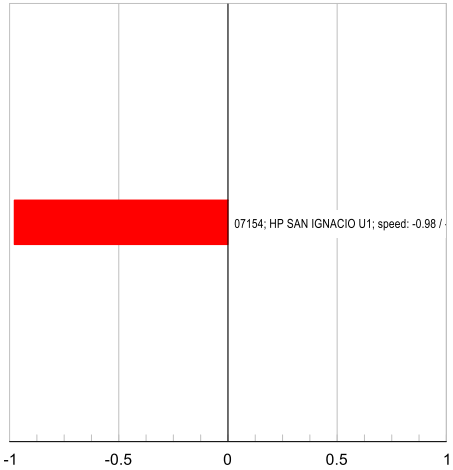
Eigenvalue of mode: -0.985 +18.759*j
Magnitude: 18.785 1/s, Angle: 93.005 deg
Period: 0.335 s, Frequency: 2.986 Hz
Damping: 0.985 1/s, Ratio of Amplitudes: 1.391

Mode 25: Observability



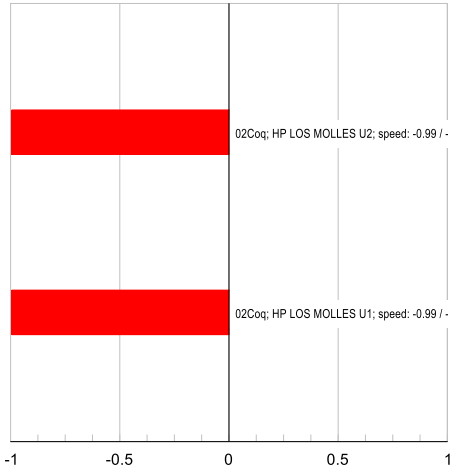
Eigenvalue of mode: -0.323 +5.738*j
Magnitude: 5.747 1/s, Angle: 93.222 deg
Period: 1.095 s, Frequency: 0.913 Hz
Damping: 0.323 1/s, Ratio of Amplitudes: 1.424

Mode 45: Participation



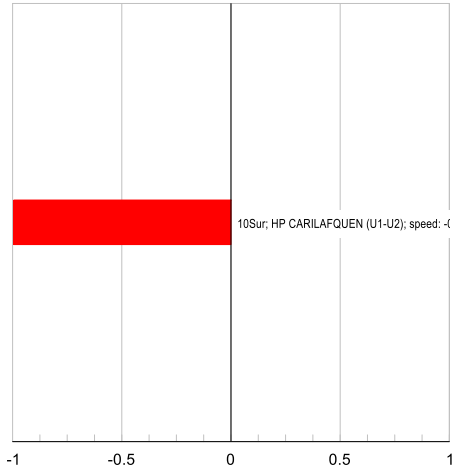
Eigenvalue of mode: -0.462 +8.962*j
Magnitude: 8.974 1/s, Angle: 92.950 deg
Period: 0.701 s, Frequency: 1.426 Hz
Damping: 0.462 1/s, Ratio of Amplitudes: 1.382
Min. contribution: 0.100

Mode 117: Participation



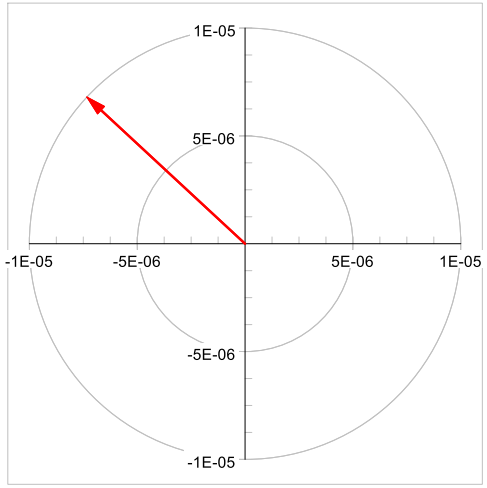
Eigenvalue of mode: -0.985 +18.759*j
Magnitude: 18.785 1/s, Angle: 93.005 deg
Period: 0.335 s, Frequency: 2.986 Hz
Damping: 0.985 1/s, Ratio of Amplitudes: 1.391
Min. contribution: 0.100

Mode 25: Participation



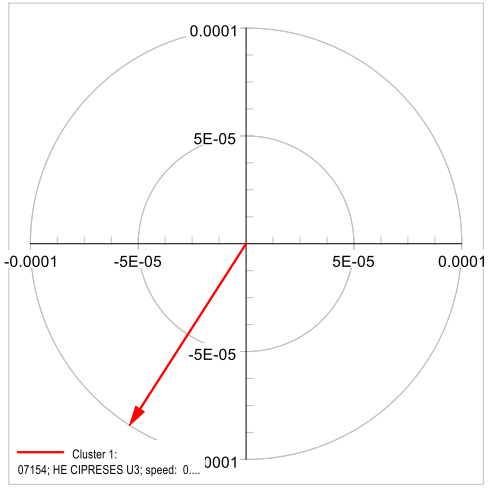
Eigenvalue of mode: -0.323 +5.738*j
Magnitude: 5.747 1/s, Angle: 93.222 deg
Period: 1.095 s, Frequency: 0.913 Hz
Damping: 0.323 1/s, Ratio of Amplitudes: 1.424
Min. contribution: 0.100

Mode 135: Observability



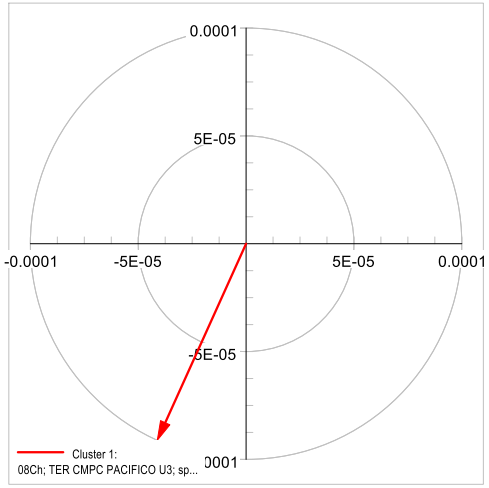
Eigenvalue of mode: -1.032 +15.719*j
Magnitude: 15.752 1/s, Angle: 93.756 deg
Period: 0.400 s, Frequency: 2.502 Hz
Damping: 1.032 1/s, Ratio of Amplitudes: 1.511

Mode 57: Observability



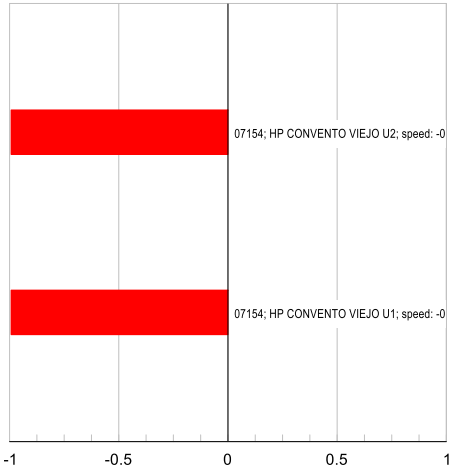
Eigenvalue of mode: -0.554 +8.344*j
Magnitude: 8.362 1/s, Angle: 93.796 deg
Period: 0.753 s, Frequency: 1.328 Hz
Damping: 0.554 1/s, Ratio of Amplitudes: 1.517

Mode 73: Observability



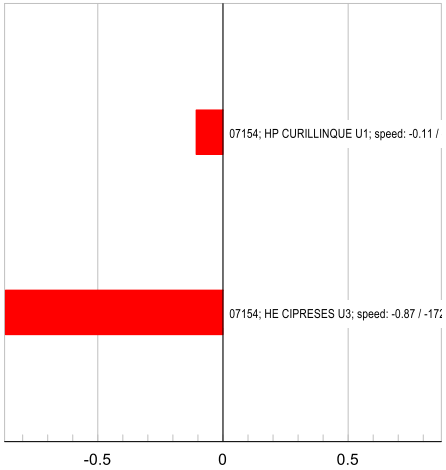
Eigenvalue of mode: -0.727 +10.726*j
Magnitude: 10.751 1/s, Angle: 93.876 deg
Period: 0.586 s, Frequency: 1.707 Hz
Damping: 0.727 1/s, Ratio of Amplitudes: 1.531

Mode 135: Participation



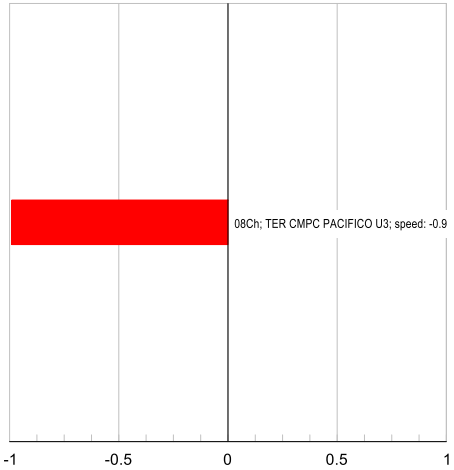
Eigenvalue of mode: -1.032 +15.719*j
Magnitude: 15.752 1/s, Angle: 93.756 deg
Period: 0.400 s, Frequency: 2.502 Hz
Damping: 1.032 1/s, Ratio of Amplitudes: 1.511
Min. contribution: 0.100

Mode 57: Participation



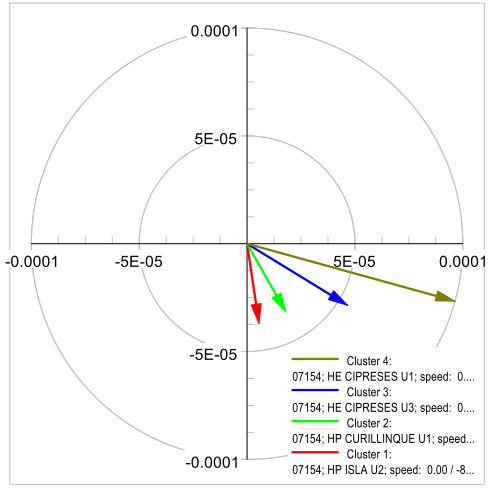
Eigenvalue of mode: -0.554 +8.344*j
Magnitude: 8.362 1/s, Angle: 93.796 deg
Period: 0.753 s, Frequency: 1.328 Hz
Damping: 0.554 1/s, Ratio of Amplitudes: 1.517
Min. contribution: 0.100

Mode 73: Participation



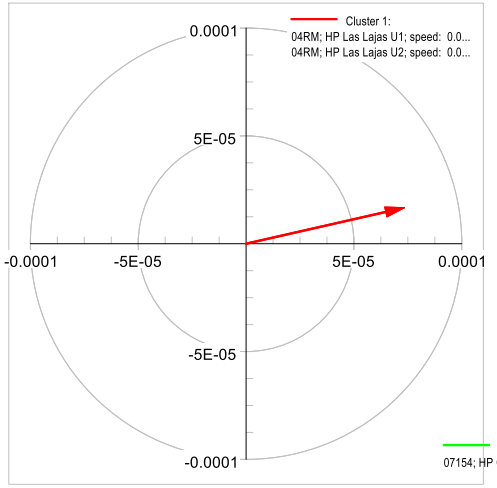
Eigenvalue of mode: -0.727 +10.726*j
Magnitude: 10.751 1/s, Angle: 93.876 deg
Period: 0.586 s, Frequency: 1.707 Hz
Damping: 0.727 1/s, Ratio of Amplitudes: 1.531
Min. contribution: 0.100

Mode 49: Observability



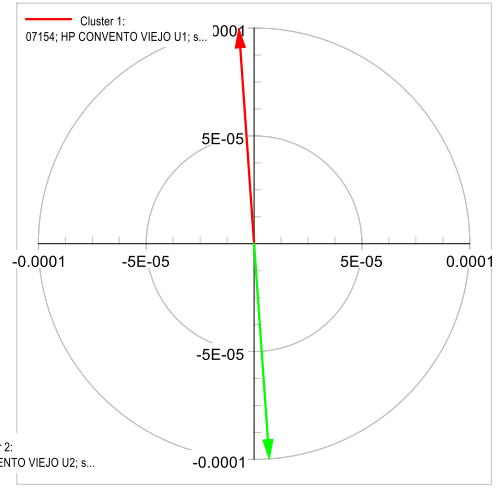
Eigenvalue of mode: -0.492 +7.151*j
Magnitude: 7.168 1/s, Angle: 93.933 deg
Period: 0.879 s, Frequency: 1.138 Hz
Damping: 0.492 1/s, Ratio of Amplitudes: 1.540

Mode 31: Observability



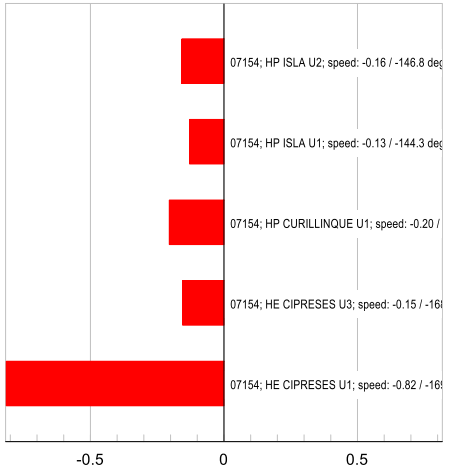
Eigenvalue of mode: -0.369 +5.281*j
Magnitude: 5.294 1/s, Angle: 93.998 deg
Period: 1.190 s, Frequency: 0.840 Hz
Damping: 0.369 1/s, Ratio of Amplitudes: 1.551

Mode 165: Observability



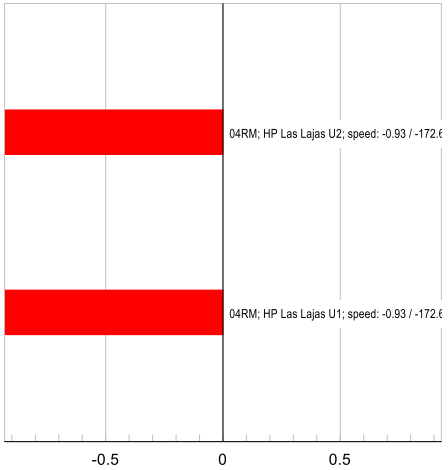
Eigenvalue of mode: -1.212 +17.192*j
Magnitude: 17.235 1/s, Angle: 94.034 deg
Period: 0.365 s, Frequency: 2.736 Hz
Damping: 1.212 1/s, Ratio of Amplitudes: 1.558

Mode 49: Participation



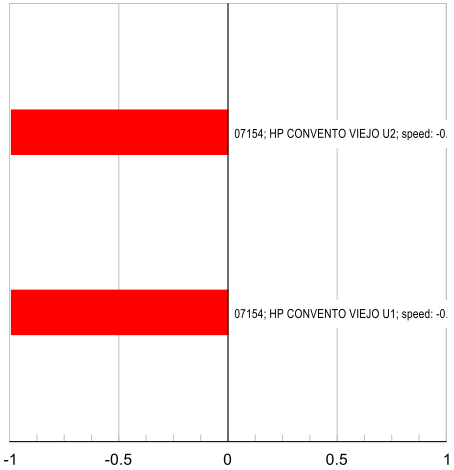
Eigenvalue of mode: -0.492 +7.151*j
Magnitude: 7.168 1/s, Angle: 93.933 deg
Period: 0.879 s, Frequency: 1.138 Hz
Damping: 0.492 1/s, Ratio of Amplitudes: 1.540
Min. contribution: 0.100

Mode 31: Participation



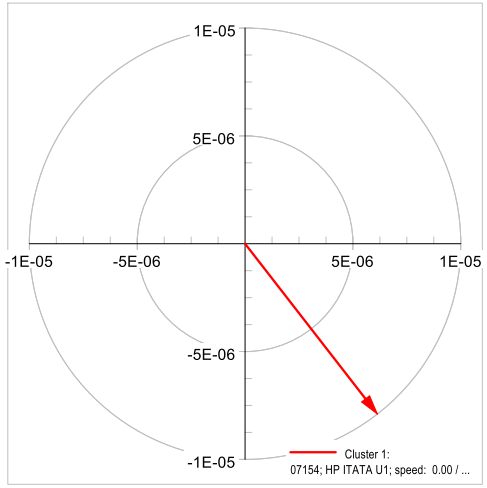
Eigenvalue of mode: -0.369 +5.281*j
Magnitude: 5.294 1/s, Angle: 93.998 deg
Period: 1.190 s, Frequency: 0.840 Hz
Damping: 0.369 1/s, Ratio of Amplitudes: 1.551
Min. contribution: 0.100

Mode 165: Participation



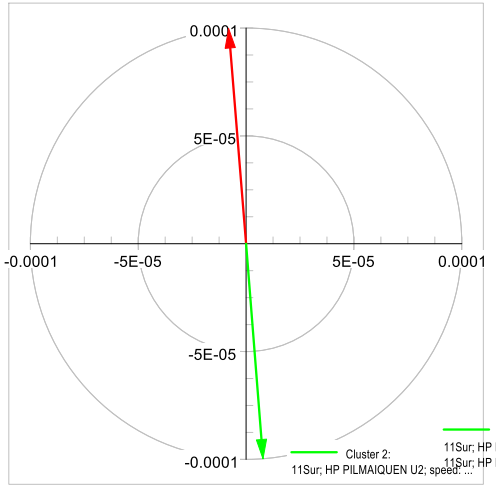
Eigenvalue of mode: -1.212 +17.192*j
Magnitude: 17.235 1/s, Angle: 94.034 deg
Period: 0.365 s, Frequency: 2.736 Hz
Damping: 1.212 1/s, Ratio of Amplitudes: 1.558
Min. contribution: 0.100

Mode 51: Observability



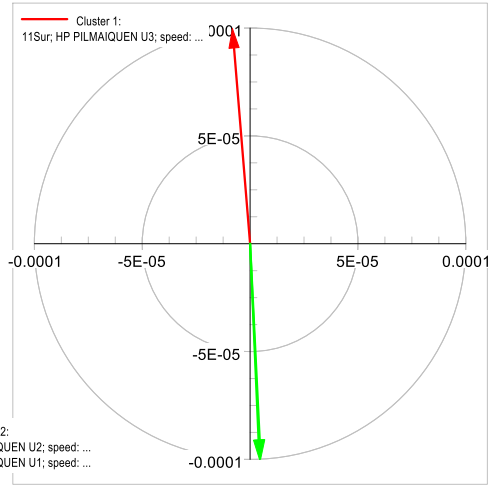
Eigenvalue of mode: -0.502 +6.410*j
Magnitude: 6.429 1/s, Angle: 94.474 deg
Period: 0.980 s, Frequency: 1.020 Hz
Damping: 0.502 1/s, Ratio of Amplitudes: 1.635

Mode 91: Observability



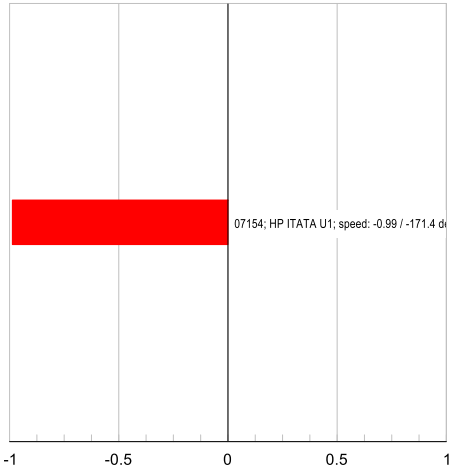
Eigenvalue of mode: -0.886 +10.944*j
Magnitude: 10.979 1/s, Angle: 94.629 deg
Period: 0.574 s, Frequency: 1.742 Hz
Damping: 0.886 1/s, Ratio of Amplitudes: 1.663

Mode 95: Observability



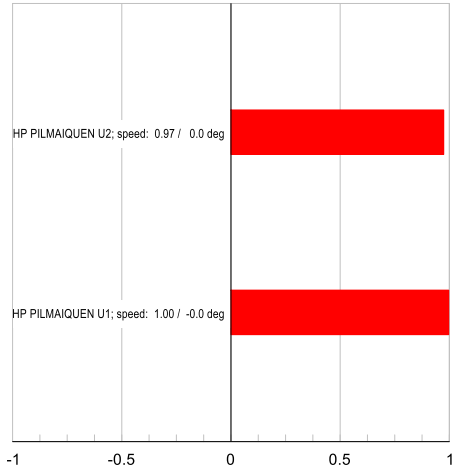
Eigenvalue of mode: -0.893 +10.885*j
Magnitude: 10.922 1/s, Angle: 94.688 deg
Period: 0.577 s, Frequency: 1.732 Hz
Damping: 0.893 1/s, Ratio of Amplitudes: 1.674

Mode 51: Participation



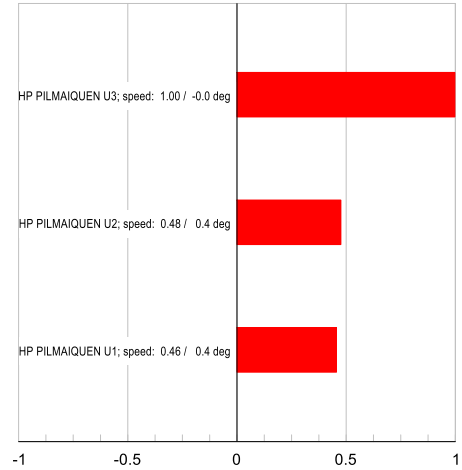
Eigenvalue of mode: -0.502 +6.410*j
Magnitude: 6.429 1/s, Angle: 94.474 deg
Period: 0.980 s, Frequency: 1.020 Hz
Damping: 0.502 1/s, Ratio of Amplitudes: 1.635
Min. contribution: 0.100

Mode 91: Participation



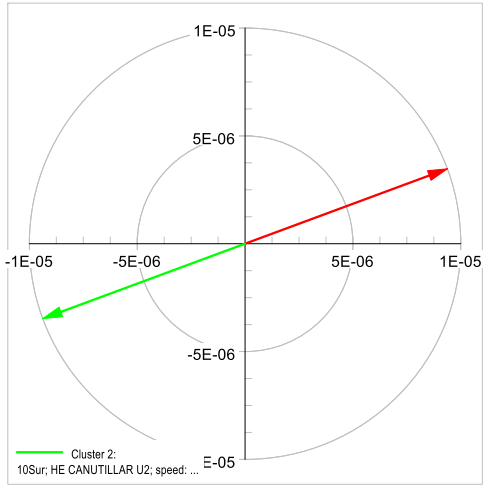
Eigenvalue of mode: -0.886 +10.944*j
Magnitude: 10.979 1/s, Angle: 94.629 deg
Period: 0.574 s, Frequency: 1.742 Hz
Damping: 0.886 1/s, Ratio of Amplitudes: 1.663
Min. contribution: 0.100

Mode 95: Participation



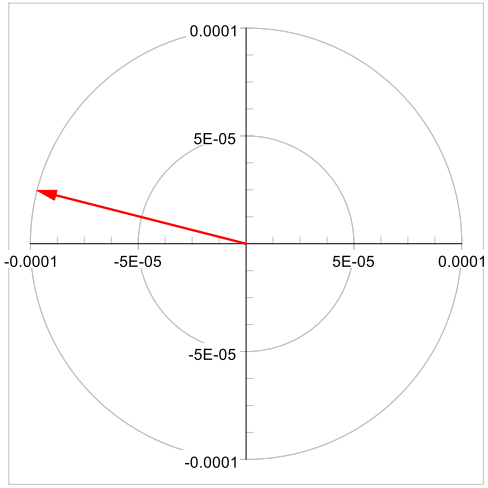
Eigenvalue of mode: -0.893 +10.885*j
Magnitude: 10.922 1/s, Angle: 94.688 deg
Period: 0.577 s, Frequency: 1.732 Hz
Damping: 0.893 1/s, Ratio of Amplitudes: 1.674
Min. contribution: 0.100

Mode 101: Observability



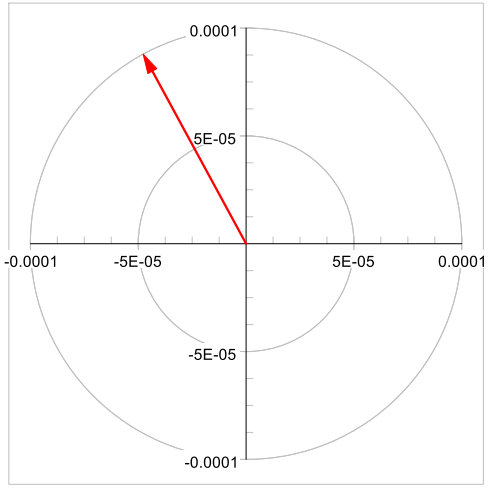
Eigenvalue of mode: -0.932 +11.362*j
Magnitude: 11.400 1/s, Angle: 94.688 deg
Period: 0.553 s, Frequency: 1.808 Hz
Damping: 0.932 1/s, Ratio of Amplitudes: 1.674

Mode 141: Observability



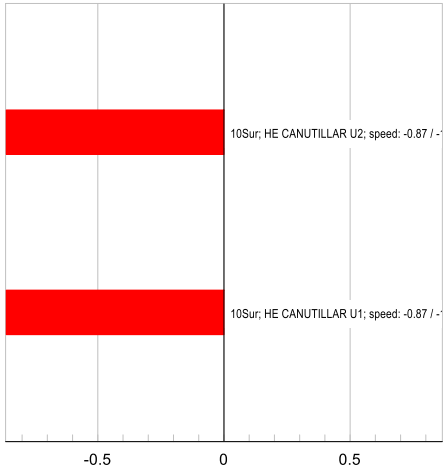
Eigenvalue of mode: -1.067 +12.965*j
Magnitude: 13.009 1/s, Angle: 94.703 deg
Period: 0.485 s, Frequency: 2.063 Hz
Damping: 1.067 1/s, Ratio of Amplitudes: 1.677

Mode 93: Observability



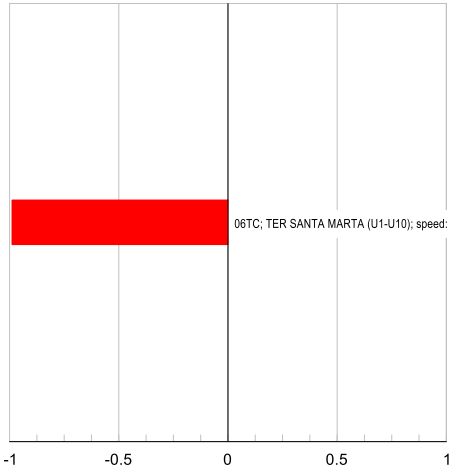
Eigenvalue of mode: -0.887 +10.634*j
Magnitude: 10.671 1/s, Angle: 94.769 deg
Period: 0.591 s, Frequency: 1.692 Hz
Damping: 0.887 1/s, Ratio of Amplitudes: 1.689

Mode 101: Participation



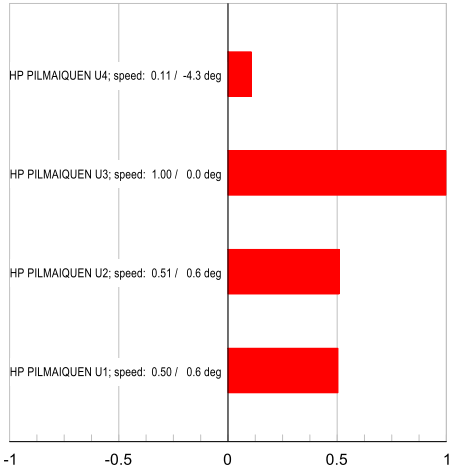
Eigenvalue of mode: -0.932 +11.362*j
Magnitude: 11.400 1/s, Angle: 94.688 deg
Period: 0.553 s, Frequency: 1.808 Hz
Damping: 0.932 1/s, Ratio of Amplitudes: 1.674
Min. contribution: 0.100

Mode 141: Participation



Eigenvalue of mode: -1.067 +12.965*j
Magnitude: 13.009 1/s, Angle: 94.703 deg
Period: 0.485 s, Frequency: 2.063 Hz
Damping: 1.067 1/s, Ratio of Amplitudes: 1.677
Min. contribution: 0.100

Mode 93: Participation



Eigenvalue of mode: -0.887 +10.634*j
Magnitude: 10.671 1/s, Angle: 94.769 deg
Period: 0.591 s, Frequency: 1.692 Hz
Damping: 0.887 1/s, Ratio of Amplitudes: 1.689
Min. contribution: 0.100

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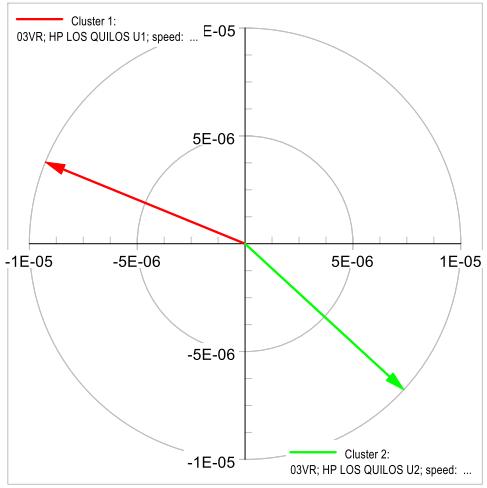
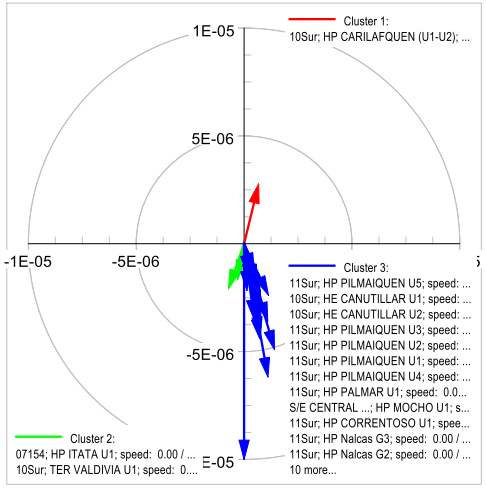
Mode 97: Observability



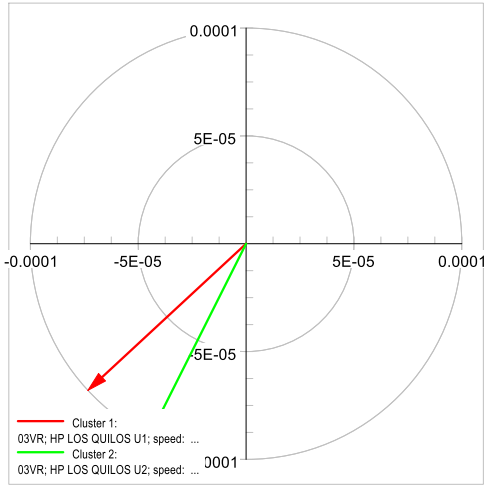
Eigenvalue of mode: -0.902 +10.736*j
Magnitude: 10.774 1/s, Angle: 94.804 deg
Period: 0.585 s, Frequency: 1.709 Hz
Damping: 0.902 1/s, Ratio of Amplitudes: 1.696

Mode 59: Observability



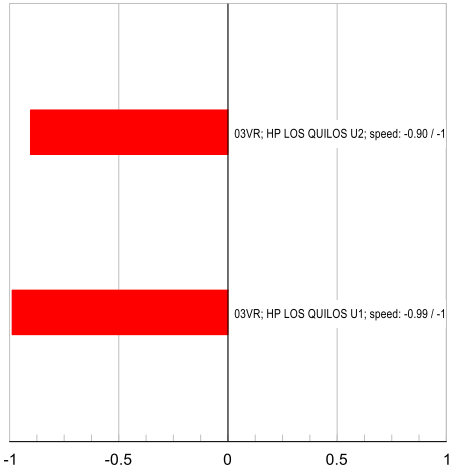
Eigenvalue of mode: -0.555 +6.302*j
Magnitude: 6.327 1/s, Angle: 95.037 deg
Period: 0.997 s, Frequency: 1.003 Hz
Damping: 0.555 1/s, Ratio of Amplitudes: 1.740

Mode 103: Observability



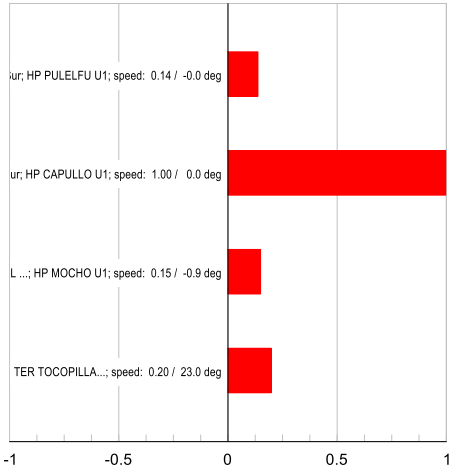
Eigenvalue of mode: -0.932 +10.431*j
Magnitude: 10.473 1/s, Angle: 95.106 deg
Period: 0.602 s, Frequency: 1.660 Hz
Damping: 0.932 1/s, Ratio of Amplitudes: 1.753

Mode 97: Participation



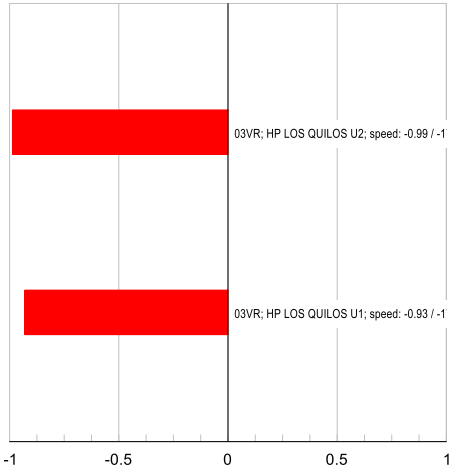
Eigenvalue of mode: -0.902 +10.736*j
Magnitude: 10.774 1/s, Angle: 94.804 deg
Period: 0.585 s, Frequency: 1.709 Hz
Damping: 0.902 1/s, Ratio of Amplitudes: 1.696
Min. contribution: 0.100

Mode 59: Participation



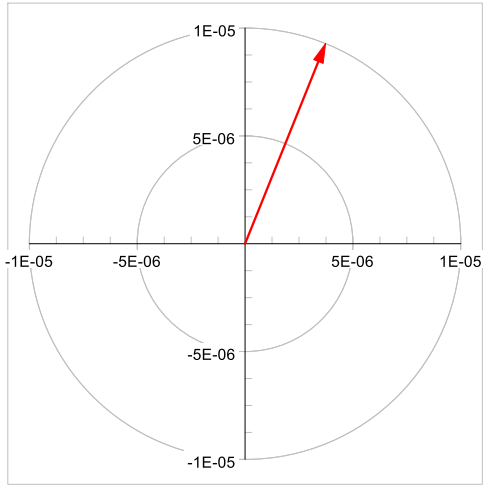
Eigenvalue of mode: -0.555 +6.302*j
Magnitude: 6.327 1/s, Angle: 95.037 deg
Period: 0.997 s, Frequency: 1.003 Hz
Damping: 0.555 1/s, Ratio of Amplitudes: 1.740
Min. contribution: 0.100

Mode 103: Participation



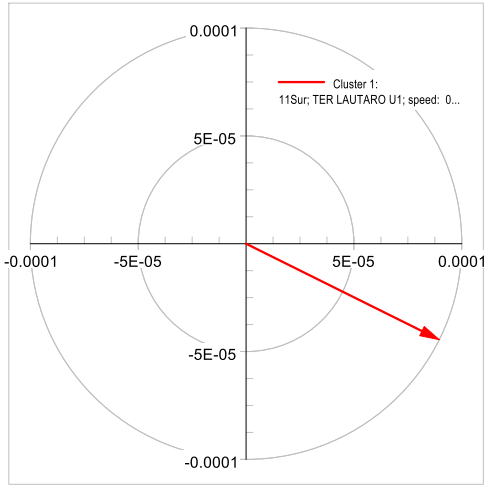
Eigenvalue of mode: -0.932 +10.431*j
Magnitude: 10.473 1/s, Angle: 95.106 deg
Period: 0.602 s, Frequency: 1.660 Hz
Damping: 0.932 1/s, Ratio of Amplitudes: 1.753
Min. contribution: 0.100

Mode 43: Observability



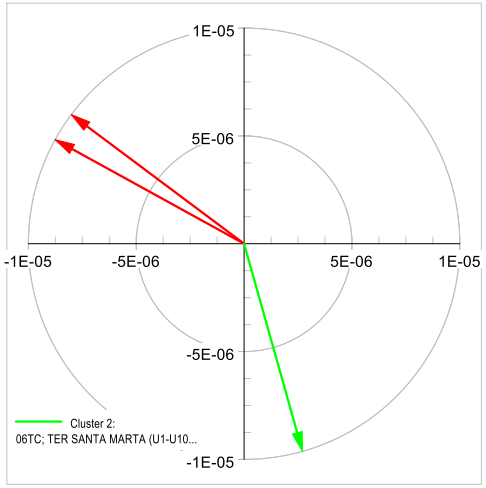
Eigenvalue of mode: -0.446 +4.931*j
Magnitude: 4.951 1/s, Angle: 95.165 deg
Period: 1.274 s, Frequency: 0.785 Hz
Damping: 0.446 1/s, Ratio of Amplitudes: 1.765

Mode 67: Observability



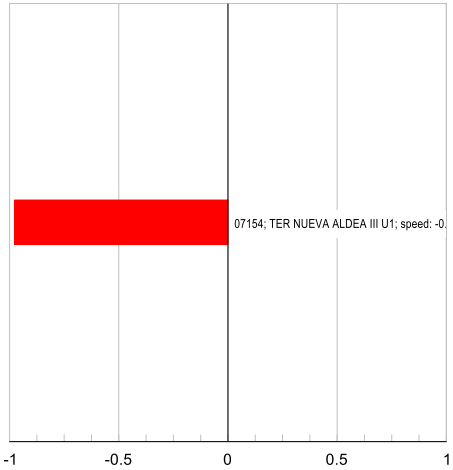
Eigenvalue of mode: -0.677 +7.472*j
Magnitude: 7.502 1/s, Angle: 95.176 deg
Period: 0.841 s, Frequency: 1.189 Hz
Damping: 0.677 1/s, Ratio of Amplitudes: 1.767

Mode 163: Observability



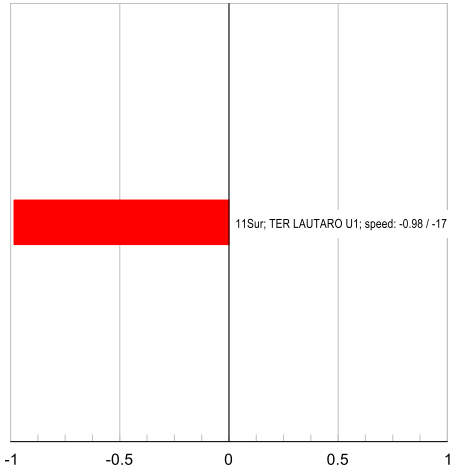
Eigenvalue of mode: -1.189 +13.111*j
Magnitude: 13.164 1/s, Angle: 95.181 deg
Period: 0.479 s, Frequency: 2.087 Hz
Damping: 1.189 1/s, Ratio of Amplitudes: 1.768

Mode 43: Participation



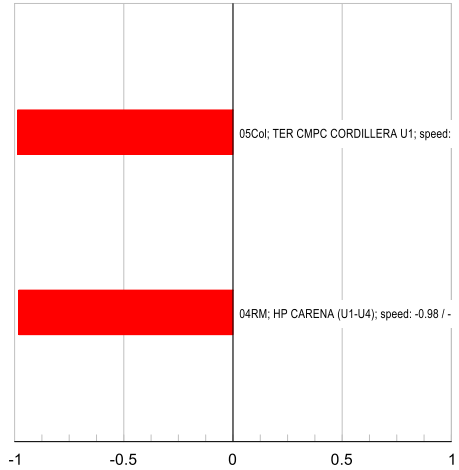
Eigenvalue of mode: -0.446 +4.931*j
Magnitude: 4.951 1/s, Angle: 95.165 deg
Period: 1.274 s, Frequency: 0.785 Hz
Damping: 0.446 1/s, Ratio of Amplitudes: 1.765
Min. contribution: 0.100

Mode 67: Participation



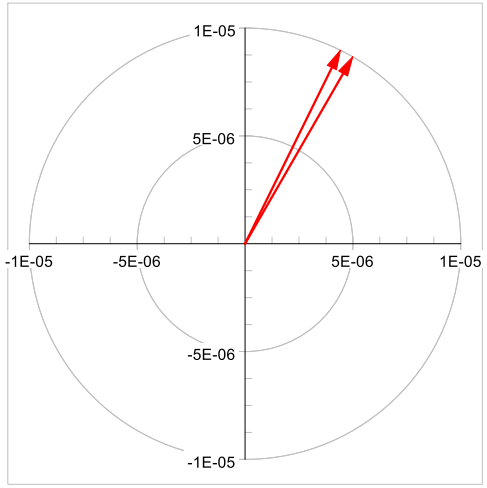
Eigenvalue of mode: -0.677 +7.472*j
Magnitude: 7.502 1/s, Angle: 95.176 deg
Period: 0.841 s, Frequency: 1.189 Hz
Damping: 0.677 1/s, Ratio of Amplitudes: 1.767
Min. contribution: 0.100

Mode 163: Participation



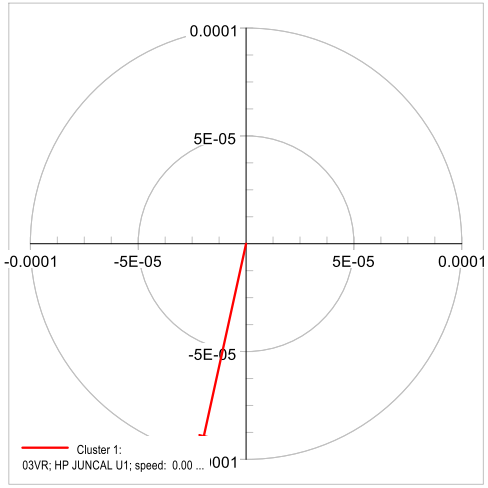
Eigenvalue of mode: -1.189 +13.111*j
Magnitude: 13.164 1/s, Angle: 95.181 deg
Period: 0.479 s, Frequency: 2.087 Hz
Damping: 1.189 1/s, Ratio of Amplitudes: 1.768
Min. contribution: 0.100

Mode 77: Observability



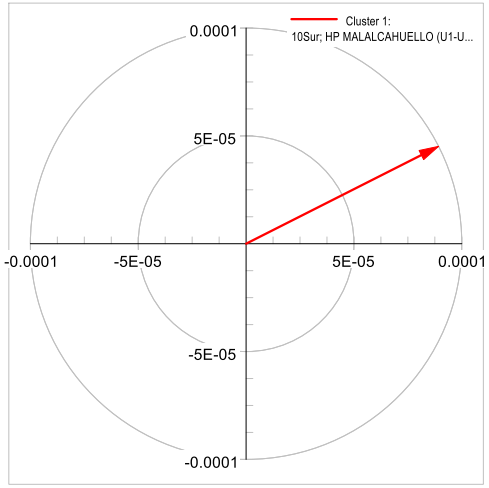
Eigenvalue of mode: -0.760 +8.322*j
Magnitude: 8.357 1/s, Angle: 95.215 deg
Period: 0.755 s, Frequency: 1.325 Hz
Damping: 0.760 1/s, Ratio of Amplitudes: 1.774

Mode 81: Observability



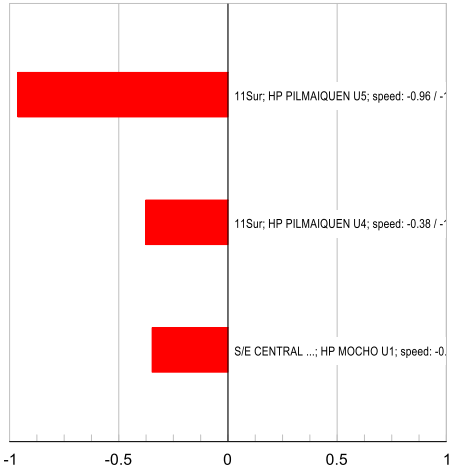
Eigenvalue of mode: -0.794 +8.643*j
Magnitude: 8.680 1/s, Angle: 95.249 deg
Period: 0.727 s, Frequency: 1.376 Hz
Damping: 0.794 1/s, Ratio of Amplitudes: 1.781

Mode 99: Observability



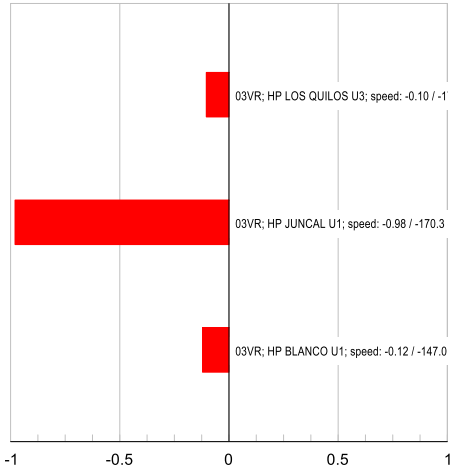
Eigenvalue of mode: -0.925 +9.906*j
Magnitude: 9.949 1/s, Angle: 95.337 deg
Period: 0.634 s, Frequency: 1.577 Hz
Damping: 0.925 1/s, Ratio of Amplitudes: 1.799

Mode 77: Participation



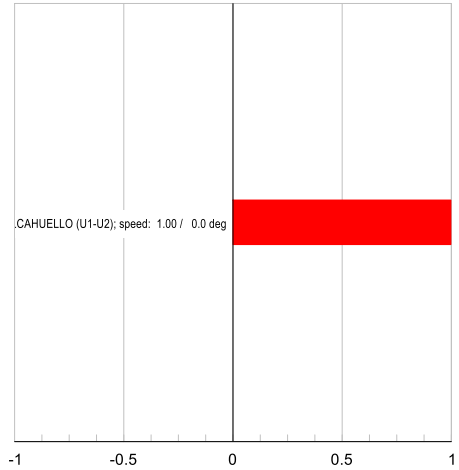
Eigenvalue of mode: -0.760 +8.322*j
Magnitude: 8.357 1/s, Angle: 95.215 deg
Period: 0.755 s, Frequency: 1.325 Hz
Damping: 0.760 1/s, Ratio of Amplitudes: 1.774
Min. contribution: 0.100

Mode 81: Participation



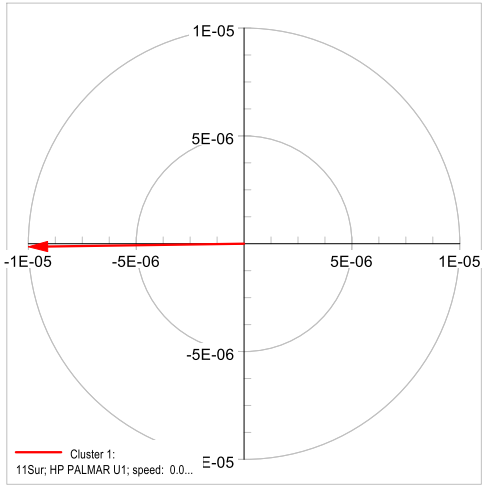
Eigenvalue of mode: -0.794 +8.643*j
Magnitude: 8.680 1/s, Angle: 95.249 deg
Period: 0.727 s, Frequency: 1.376 Hz
Damping: 0.794 1/s, Ratio of Amplitudes: 1.781
Min. contribution: 0.100

Mode 99: Participation



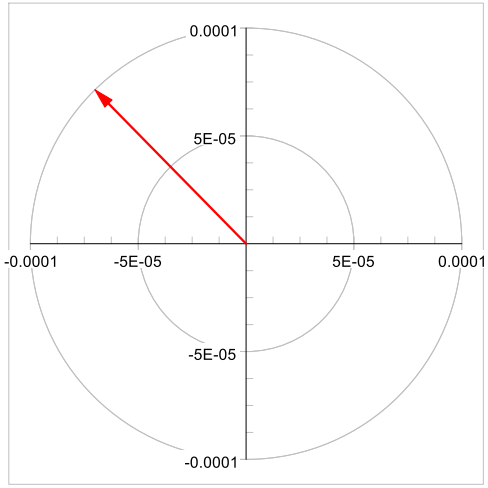
Eigenvalue of mode: -0.925 +9.906*j
Magnitude: 9.949 1/s, Angle: 95.337 deg
Period: 0.634 s, Frequency: 1.577 Hz
Damping: 0.925 1/s, Ratio of Amplitudes: 1.799
Min. contribution: 0.100

Mode 87: Observability



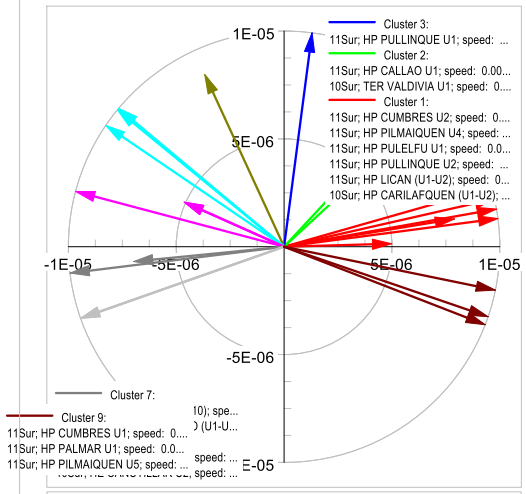
Eigenvalue of mode: -0.868 +9.259*j
Magnitude: 9.299 1/s, Angle: 95.353 deg
Period: 0.679 s, Frequency: 1.474 Hz
Damping: 0.868 1/s, Ratio of Amplitudes: 1.802

Mode 139: Observability



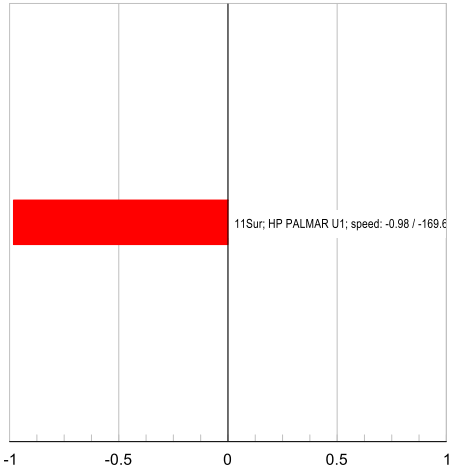
Eigenvalue of mode: -1.037 +10.448*j
Magnitude: 10.500 1/s, Angle: 95.669 deg
Period: 0.601 s, Frequency: 1.663 Hz
Damping: 1.037 1/s, Ratio of Amplitudes: 1.866

Mode 111: Observability



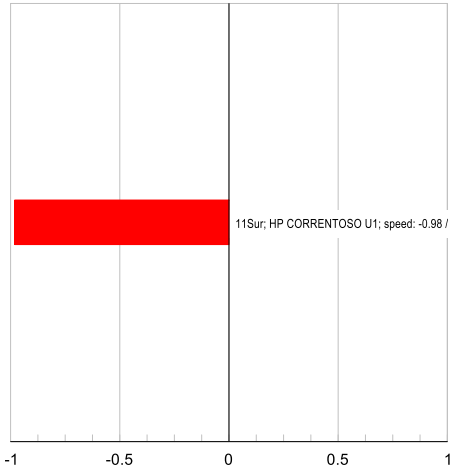
Eigenvalue of mode: -0.968 +9.715*j
Magnitude: 9.764 1/s, Angle: 95.692 deg
Period: 0.647 s, Frequency: 1.546 Hz
Damping: 0.968 1/s, Ratio of Amplitudes: 1.871

Mode 87: Participation



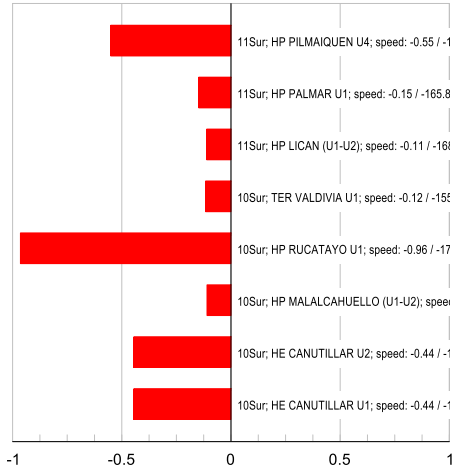
Eigenvalue of mode: -0.868 +9.259*j
Magnitude: 9.299 1/s, Angle: 95.353 deg
Period: 0.679 s, Frequency: 1.474 Hz
Damping: 0.868 1/s, Ratio of Amplitudes: 1.802
Min. contribution: 0.100

Mode 139: Participation

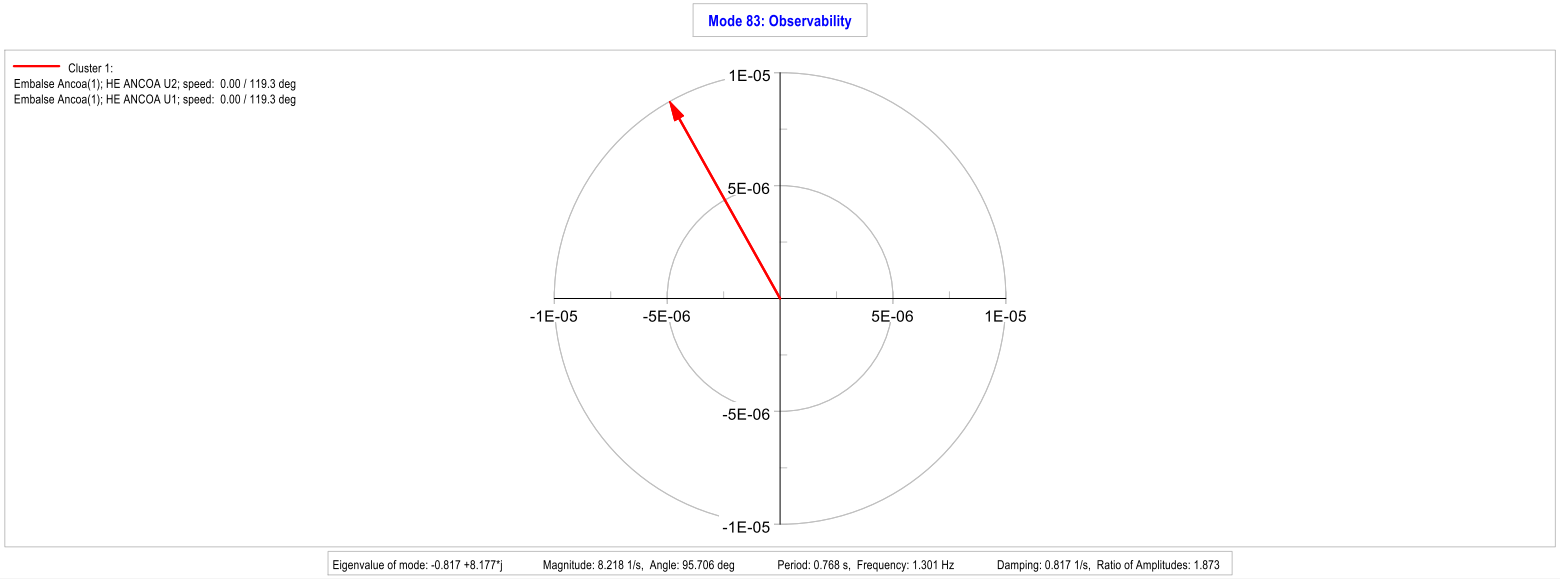


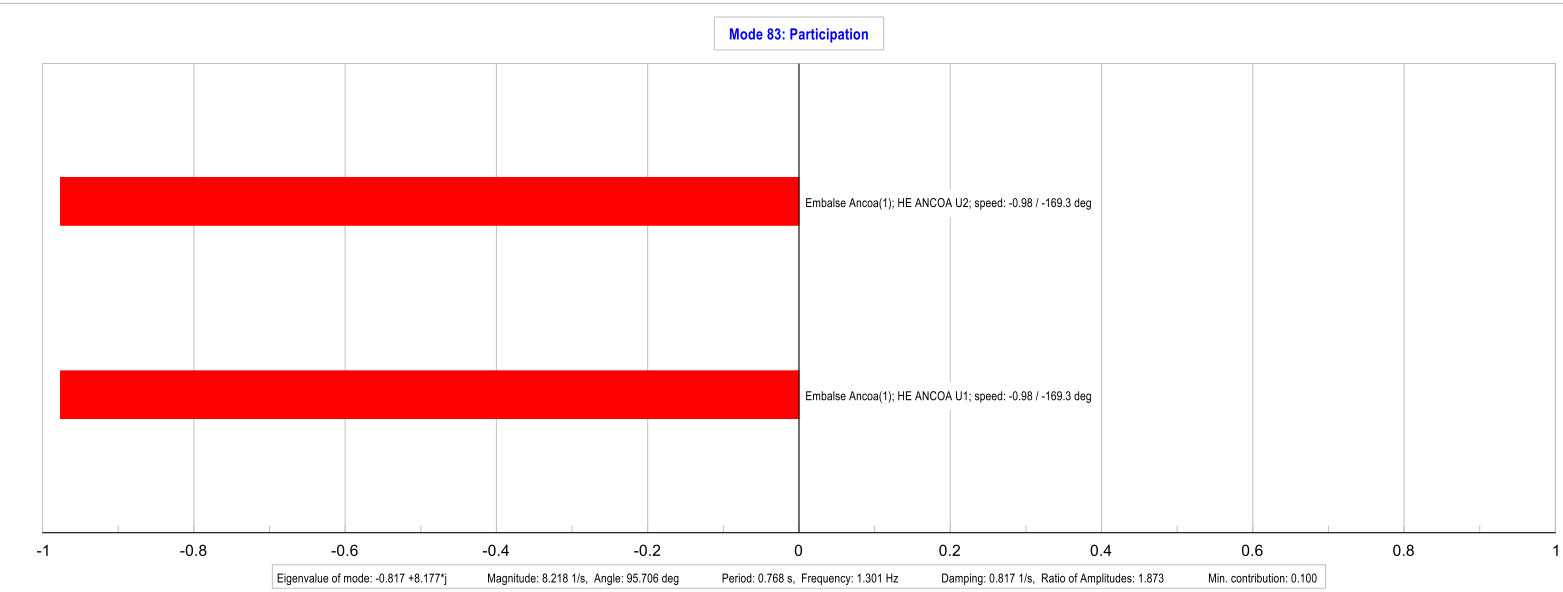
Eigenvalue of mode: -1.037 +10.448*j
Magnitude: 10.500 1/s, Angle: 95.669 deg
Period: 0.601 s, Frequency: 1.663 Hz
Damping: 1.037 1/s, Ratio of Amplitudes: 1.866
Min. contribution: 0.100

Mode 111: Participation

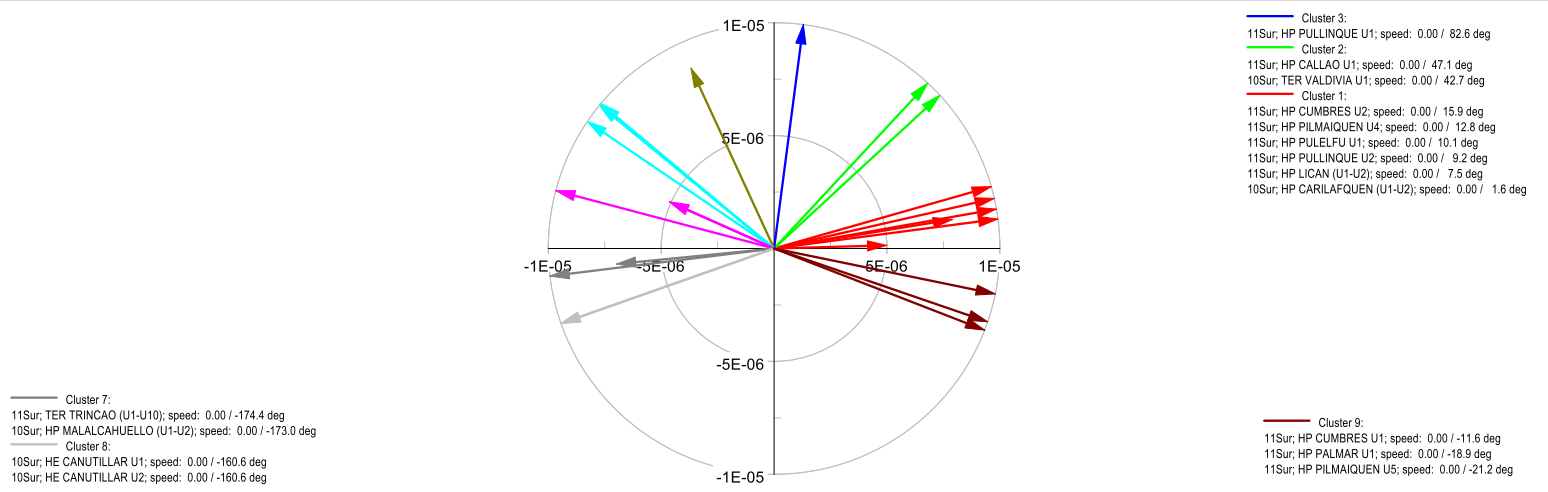


Eigenvalue of mode: -0.968 +9.715*j
Magnitude: 9.764 1/s, Angle: 95.692 deg
Period: 0.647 s, Frequency: 1.546 Hz
Damping: 0.968 1/s, Ratio of Amplitudes: 1.871
Min. contribution: 0.100


Mode 83: Observability
Cluster 1:
Embalse Ancoa(1); HE ANCOA U2; speed: 0.00 / 119.3 deg
Embalse Ancoa(1); HE ANCOA U1; speed: 0.00 / 119.3 deg
1E-05
5E-06
-1E-05
-5E-06
5E-06
1E-05
-5E-06
-1E-05
Eigenvalue of mode: -0.817 +8.177*j
Magnitude: 8.218 1/s, Angle: 95.706 deg
Period: 0.768 s, Frequency: 1.301 Hz
Damping: 0.817 1/s, Ratio of Amplitudes: 1.873

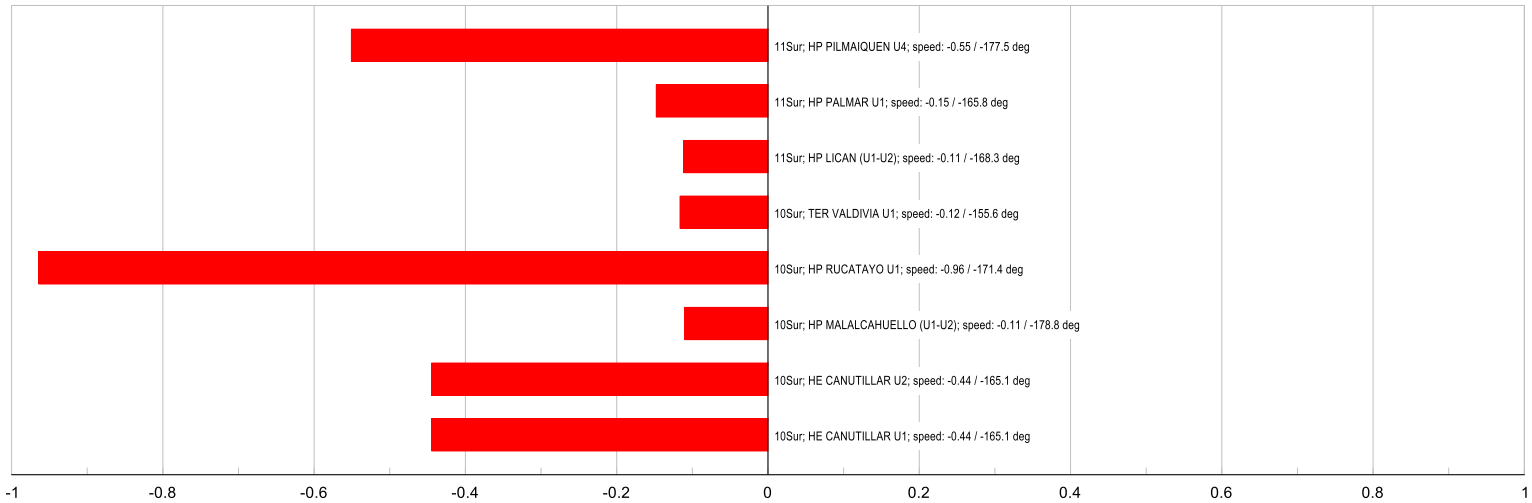

Mode 83: Participation
Embalse Ancoa(1); HE ANCOA U2; speed: -0.98 / -169.3 deg
Embalse Ancoa(1); HE ANCOA U1; speed: -0.98 / -169.3 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.817 +8.177*j
Magnitude: 8.218 1/s, Angle: 95.706 deg
Period: 0.768 s, Frequency: 1.301 Hz
Damping: 0.817 1/s, Ratio of Amplitudes: 1.873
Min. contribution: 0.100

Mode 111: Observability



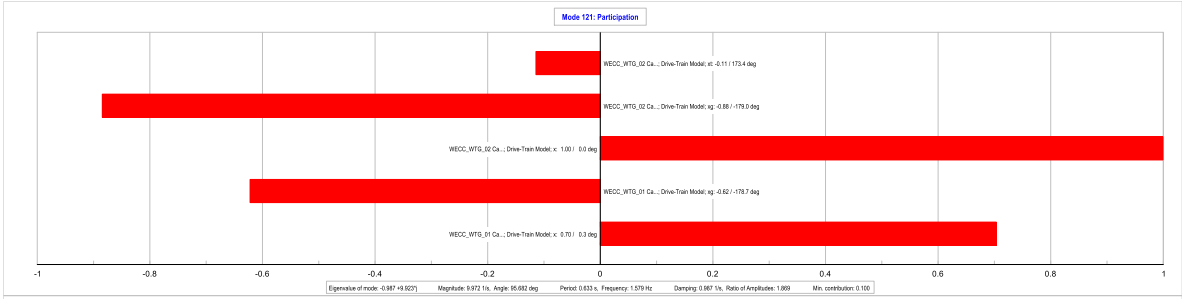
Eigenvalue of mode: -0.968 +9.715*j Magnitude: 9.764 1/s, Angle: 95.692 deg Period: 0.647 s, Frequency: 1.546 Hz Damping: 0.968 1/s, Ratio of Amplitudes: 1.871

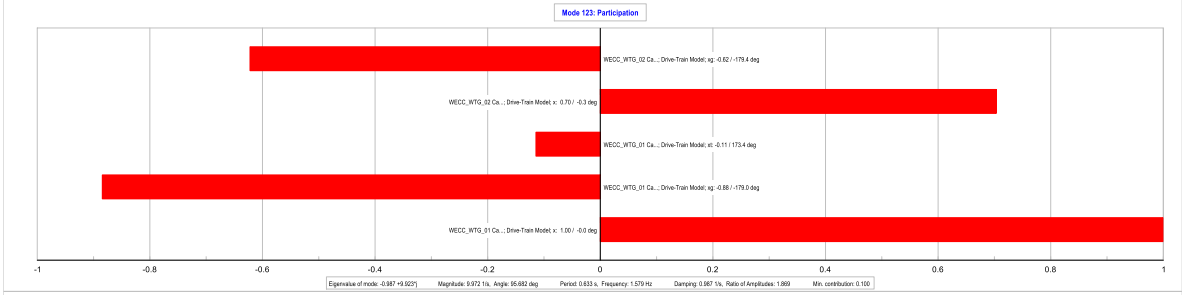
Mode 111: Participation

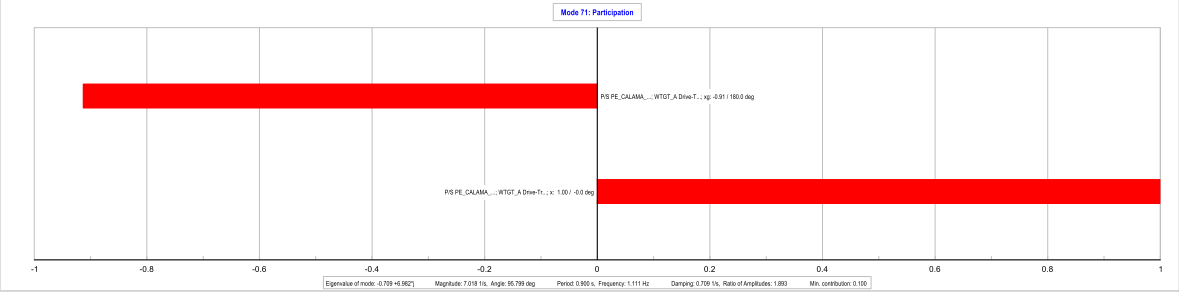


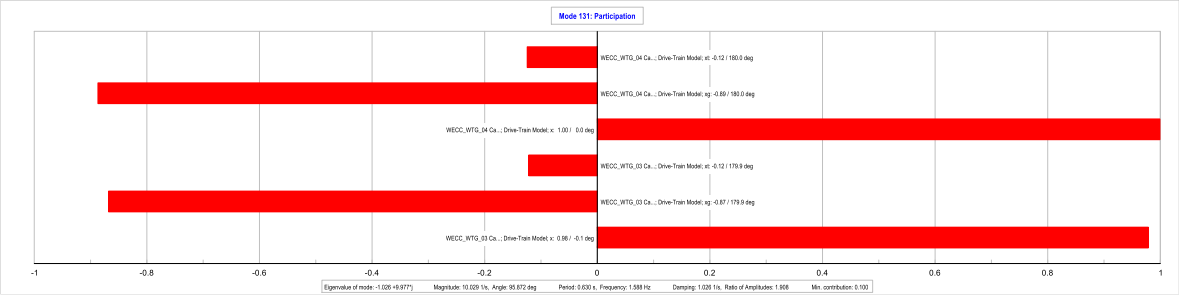
Eigenvalue of mode: -0.968 +9.715*j Magnitude: 9.764 1/s, Angle: 95.692 deg Period: 0.647 s, Frequency: 1.546 Hz Damping: 0.968 1/s, Ratio of Amplitudes: 1.871 Min. contribution: 0.100

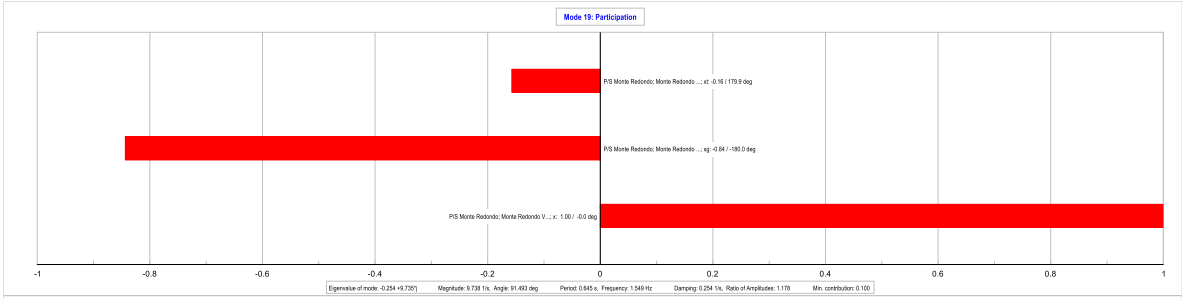

Mode 53: Participation
PE Alena Con...; Two mass model; xHgen: -0.32 / -134.1 deg
PE Alena Con...; Two mass model; xHWTR: -0.38 / 114.5 deg
PE Alena Contr...; Two mass model; x: 1.00 / 0.0 deg
PE Alena Contr...; Pitch angle con...; x: -0.35 / -127.0 deg
PE Alena Con...; P control mo...; xwfilt: 0.13 / -27.6 deg
PE Alena Contr...; P control mode...; x2: 0.13 / -30.6 deg
PE Alena Contr...; P control mode...; x1: -0.24 / 149.4 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.504 +5.078i[1] Magnitude: 5.103 1/s, Angle: 95.673 deg Period: 1.237 s, Frequency: 0.808 Hz Damping: 0.504 1/s, Ratio of Amplitudes: 1.867 Min. contribution: 0.100
Mode 39: Participation
P/S PE Puelc...; Two mass model; xHgen: -0.28 / -131.8 deg
P/S PE Puelc...; Two mass model; xHWTR: -0.39 / 116.1 deg
P/S PE Pueloha Sur; Two mass model; x: 1.00 / 0.0 deg
P/S PE Pueloha...; Pitch angle con...; x: -0.35 / -128.7 deg
P/S PE Puelc...; P control mo...; xwfilt: 0.12 / -30.5 deg
P/S PE Pueloha...; P control mode...; x2: 0.10 / -33.4 deg
P/S PE Pueloha...; P control mode...; x1: -0.20 / 146.6 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.401 +5.003i[1] Magnitude: 5.019 1/s, Angle: 94.585 deg Period: 1.256 s, Frequency: 0.796 Hz Damping: 0.401 1/s, Ratio of Amplitudes: 1.655 Min. contribution: 0.100
Mode 107: Participation
Plant_VDLV 2; VDLV Drive-Train; xt: -0.11 / 175.2 deg
Plant_VDLV 2; VDLV Drive-Train; xg: -0.85 / -179.4 deg
Plant_VDLV 2; VDLV Drive-Train; x: 1.00 / 0.0 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.31 / -177.9 deg
Plant_VDLV 1; VDLV Drive-Train; x: 0.36 / 1.5 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.965 +12.349i[1] Magnitude: 12.387 1/s, Angle: 94.470 deg Period: 0.509 s, Frequency: 1.965 Hz Damping: 0.965 1/s, Ratio of Amplitudes: 1.634 Min. contribution: 0.100
Mode 109: Participation
Plant_VDLV 2; VDLV Drive-Train; xg: -0.31 / 179.2 deg
Plant_VDLV 2; VDLV Drive-Train; x: 0.36 / -1.5 deg
Plant_VDLV 1; VDLV Drive-Train; xt: -0.11 / 175.2 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.85 / -179.4 deg
Plant_VDLV 1; VDLV Drive-Train; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.967 +12.351i[1] Magnitude: 12.388 1/s, Angle: 94.476 deg Period: 0.509 s, Frequency: 1.966 Hz Damping: 0.967 1/s, Ratio of Amplitudes: 1.635 Min. contribution: 0.100

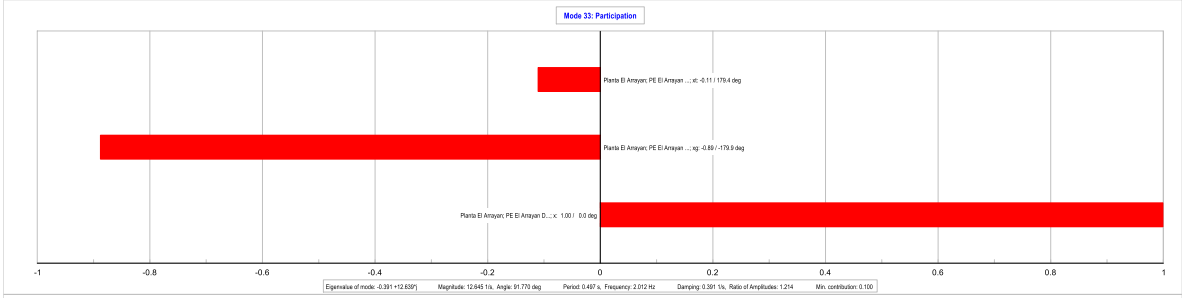

Mode 121: Participation
WECC_WTG_02 Ca...; Drive-Train Model; st: -0.11 / 173.4 deg
WECC_WTG_02 Ca...; Drive-Train Model; sg: -0.88 / -179.0 deg
WECC_WTG_02 Ca...; Drive-Train Model; x: 1.00 / 0.0 deg
WECC_WTG_01 Ca...; Drive-Train Model; sg: -0.62 / -178.7 deg
WECC_WTG_01 Ca...; Drive-Train Model; x: 0.70 / 0.3 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.987 +9.923*j Magnitude: 9.972 1/s, Angle: 95.682 deg Period: 0.633 s, Frequency: 1.579 Hz Damping: 0.987 1/s, Ratio of Amplitudes: 1.869 Min. contribution: 0.100

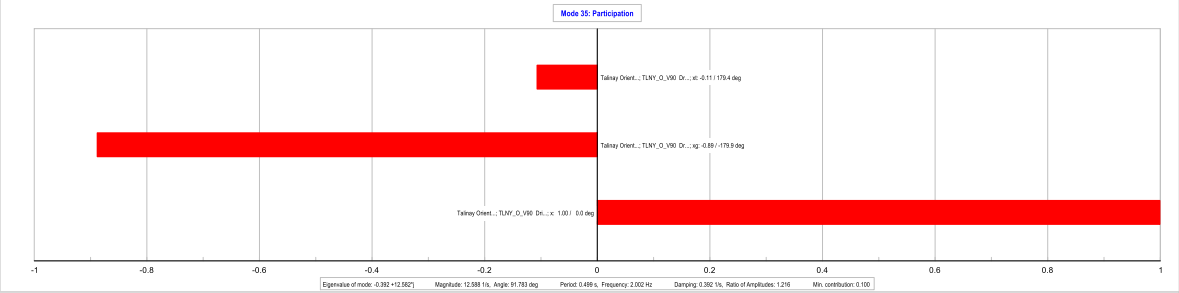

Mode 123: Participation
WECC_WTG_02 Ca...; Drive-Train Model; sg: -0.62 / -179.4 deg
WECC_WTG_02 Ca...; Drive-Train Model; x: 0.70 / -0.3 deg
WECC_WTG_01 Ca...; Drive-Train Model; st: -0.11 / 173.4 deg
WECC_WTG_01 Ca...; Drive-Train Model; sg: -0.88 / -179.0 deg
WECC_WTG_01 Ca...; Drive-Train Model; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.987 +9.923*j Magnitude: 9.972 1/s, Angle: 95.682 deg Period: 0.633 s, Frequency: 1.579 Hz Damping: 0.987 1/s, Ratio of Amplitudes: 1.869 Min. contribution: 0.100

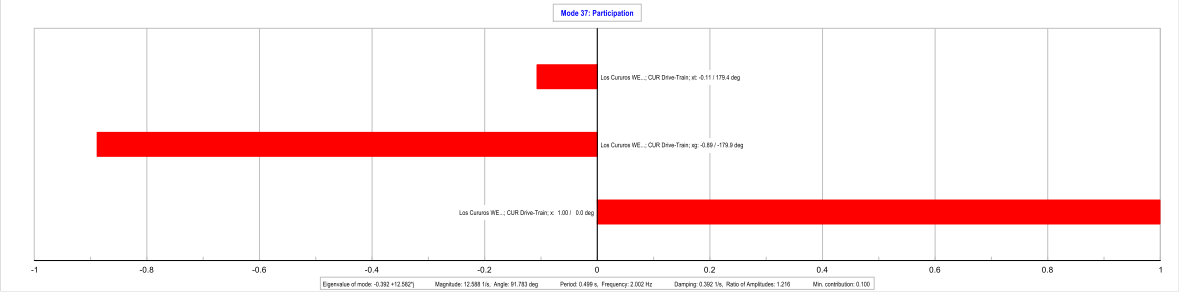

Mode 71: Participation
P/S PE_CALAMA_...; WTGT_A Drive-T...; xg: -0.91 / 180.0 deg
P/S PE_CALAMA_...; WTGT_A Drive-Tr...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.709 +6.982*j Magnitude: 7.018 1/s, Angle: 95.799 deg Period: 0.900 s, Frequency: 1.111 Hz Damping: 0.709 1/s, Ratio of Amplitudes: 1.893 Min. contribution: 0.100

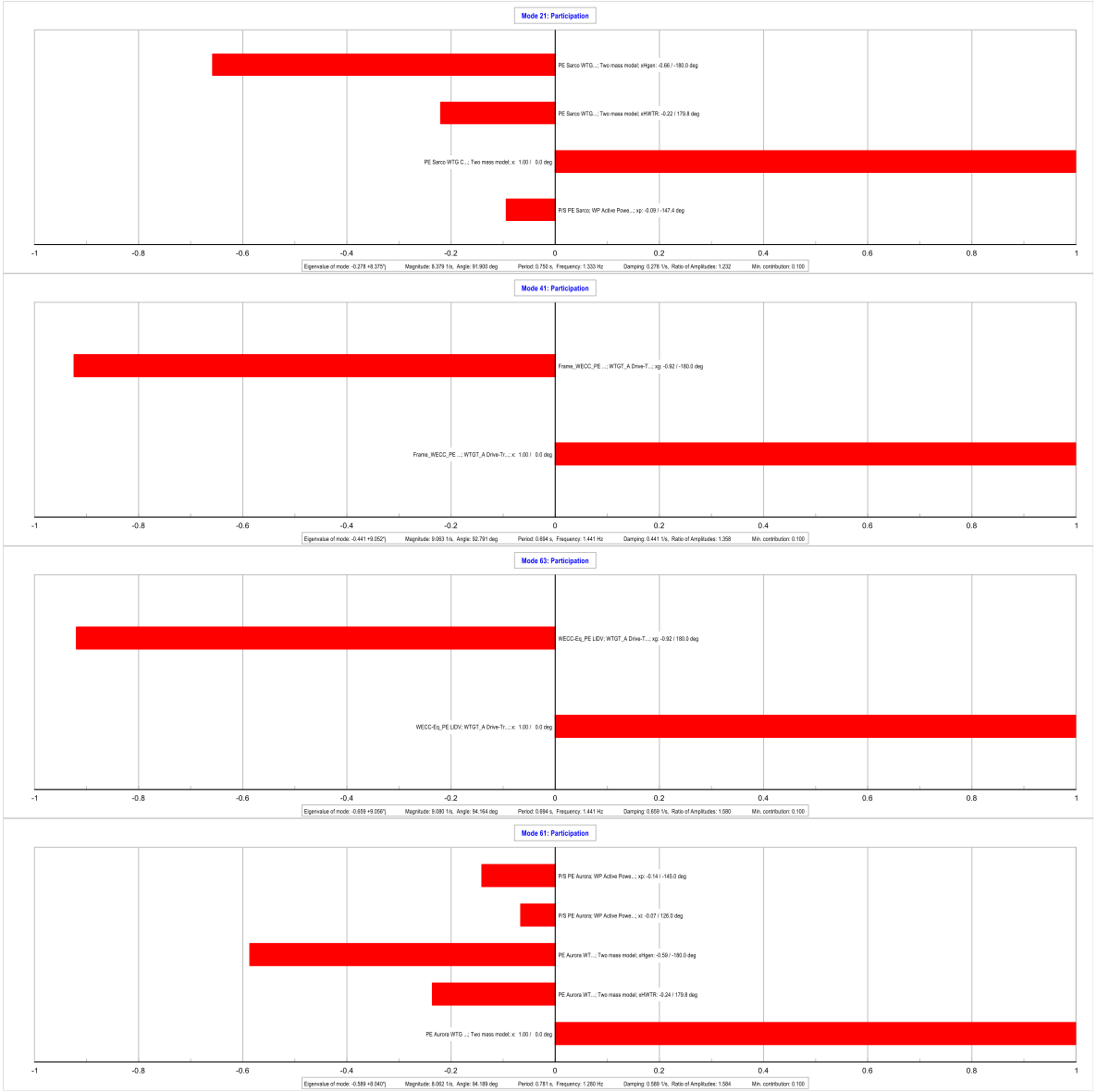

Mode 131: Participation
WECC_WTG_04 Ca...; Drive-Train Model; st: -0.12 / 180.0 deg
WECC_WTG_04 Ca...; Drive-Train Model; sg: -0.89 / -180.0 deg
WECC_WTG_04 Ca...; Drive-Train Model; x: 1.00 / 0.0 deg
WECC_WTG_03 Ca...; Drive-Train Model; st: -0.12 / 179.9 deg
WECC_WTG_03 Ca...; Drive-Train Model; sg: -0.87 / 179.9 deg
WECC_WTG_03 Ca...; Drive-Train Model; x: 0.96 / -0.1 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -1.026 +9.977*j Magnitude: 10.029 1/s, Angle: 95.872 deg Period: 0.630 s, Frequency: 1.588 Hz Damping: 1.026 1/s, Ratio of Amplitudes: 1.908 Min. contribution: 0.100


Mode 19: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.9 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.84 / -180.0 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.254 +9.735i*] Magnitude: 9.738 1/s, Angle: 91.493 deg Period: 0.645 s, Frequency: 1.549 Hz Damping: 0.254 1/s, Ratio of Amplitudes: 1.178 Min. contribution: 0.100

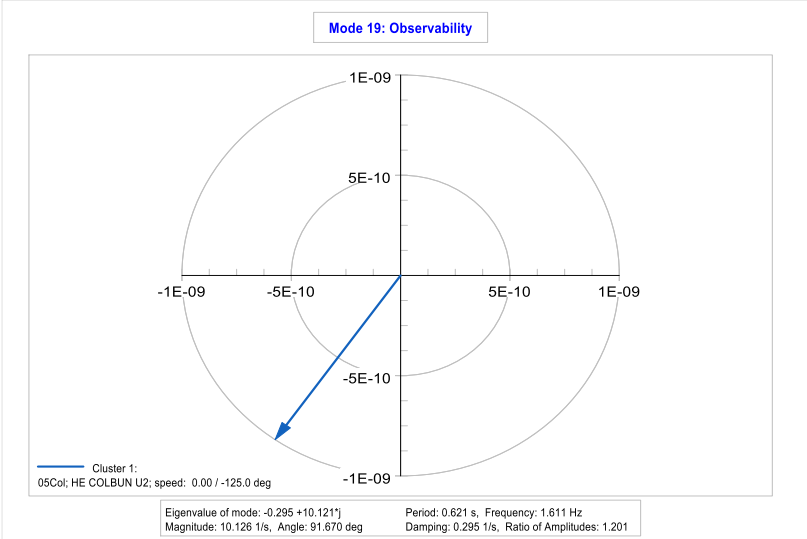

Mode 33: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 179.4 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.89 / -179.9 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.391 +12.635i*] Magnitude: 12.645 1/s, Angle: 91.770 deg Period: 0.497 s, Frequency: 2.012 Hz Damping: 0.391 1/s, Ratio of Amplitudes: 1.214 Min. contribution: 0.100

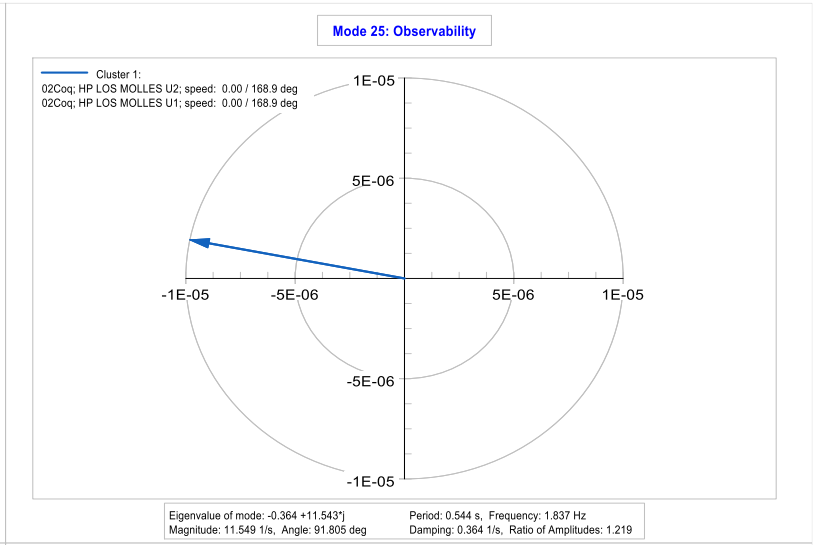

Mode 35: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 179.4 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.89 / -179.9 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.562*] Magnitude: 12.568 1/s, Angle: 91.783 deg Period: 0.499 s, Frequency: 2.002 Hz Damping: 0.392 1/s, Ratio of Amplitudes: 1.216 Min. contribution: 0.100

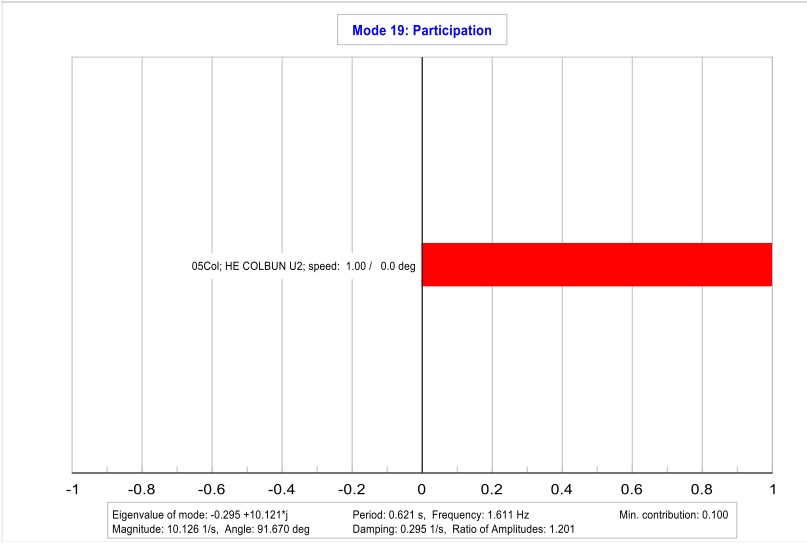

Mode 37: Participation
Los Cururos WE...; CUR Drive-Train; xt: -0.11 / 179.4 deg
Los Cururos WE...; CUR Drive-Train; xg: -0.89 / -179.9 deg
Los Cururos WE...; CUR Drive-Train; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.562*] Magnitude: 12.568 1/s, Angle: 91.783 deg Period: 0.499 s, Frequency: 2.002 Hz Damping: 0.392 1/s, Ratio of Amplitudes: 1.216 Min. contribution: 0.100

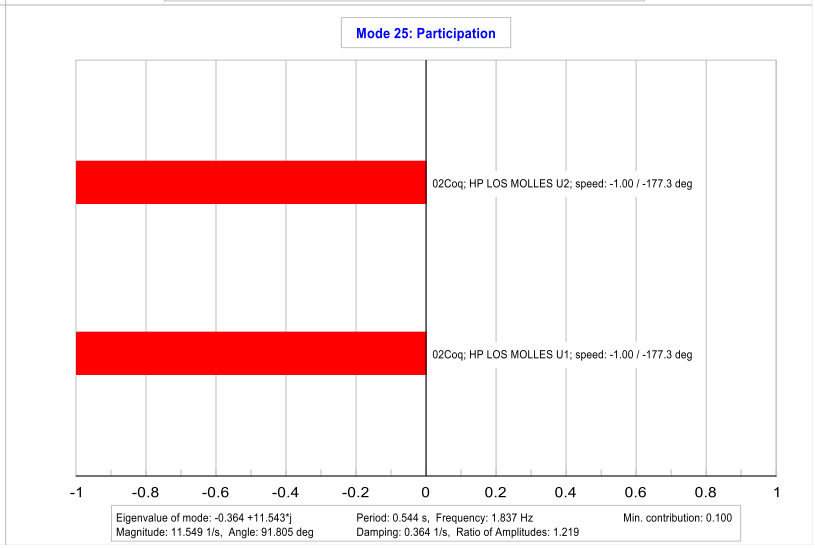

Mode 21: Participation
PE Sarco WTG...; Two mass model; sHgen: -0.66 / -180.0 deg
PE Sarco WTG...; Two mass model; sHWTR: -0.22 / 179.8 deg
PE Sarco WTG C...; Two mass model; x: 1.00 / 0.0 deg
P/S PE Sarco; WP Active Powe...; xp: -0.09 / -147.4 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.278 +8.375i*) Magnitude: 8.379 1/s, Angle: 91.900 deg Period: 0.750 s, Frequency: 1.333 Hz Damping: 0.278 1/s, Ratio of Amplitudes: 1.232 Min. contribution: 0.100
Mode 41: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xp: -0.92 / -180.0 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.441 +9.052i*) Magnitude: 9.063 1/s, Angle: 92.791 deg Period: 0.694 s, Frequency: 1.441 Hz Damping: 0.441 1/s, Ratio of Amplitudes: 1.358 Min. contribution: 0.100
Mode 63: Participation
WECC-Eq_PE LIDV; WTGT_A Drive-T...; xp: -0.92 / 180.0 deg
WECC-Eq_PE LIDV; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.659 +9.056i*) Magnitude: 9.080 1/s, Angle: 94.164 deg Period: 0.694 s, Frequency: 1.441 Hz Damping: 0.659 1/s, Ratio of Amplitudes: 1.590 Min. contribution: 0.100
Mode 61: Participation
P/S PE Aurora; WP Active Powe...; xp: -0.14 / -145.0 deg
P/S PE Aurora; WP Active Powe...; xt: -0.07 / 126.0 deg
PE Aurora WT...; Two mass model; sHgen: -0.59 / -180.0 deg
PE Aurora WT...; Two mass model; sHWTR: -0.24 / 179.8 deg
PE Aurora WTG ...; Two mass model; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.589 +8.040i*) Magnitude: 8.062 1/s, Angle: 94.189 deg Period: 0.781 s, Frequency: 1.280 Hz Damping: 0.589 1/s, Ratio of Amplitudes: 1.584 Min. contribution: 0.100

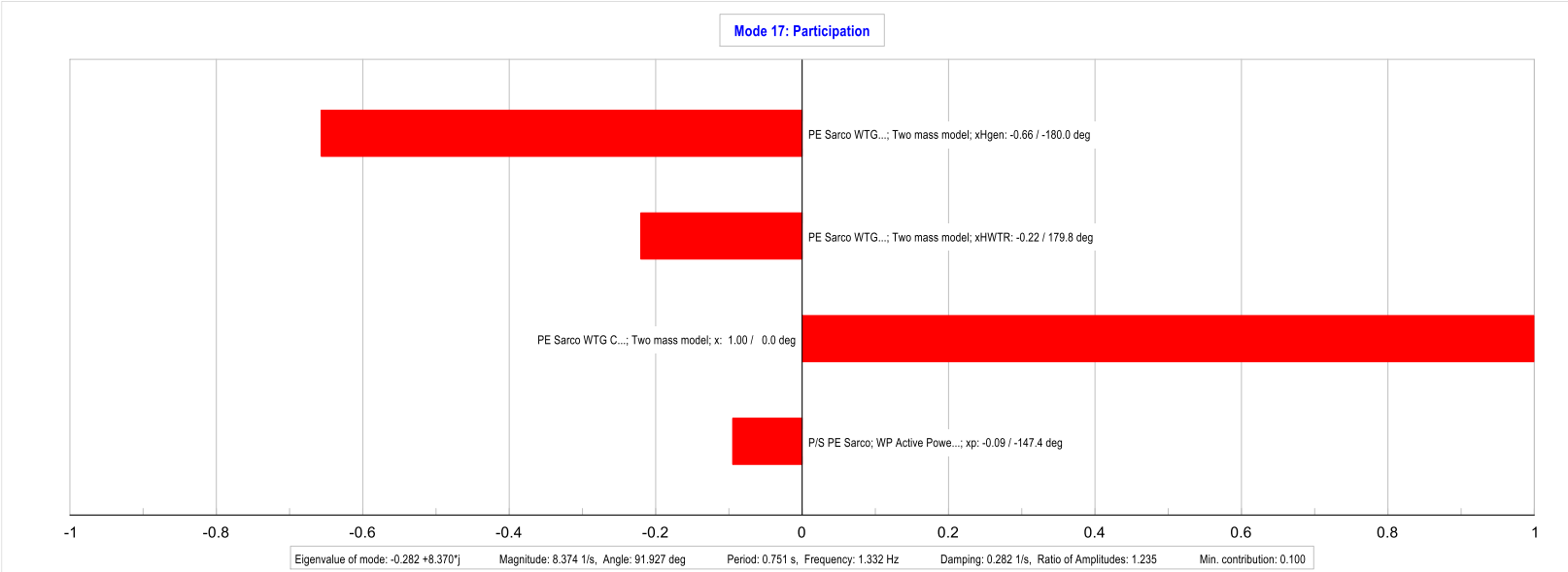
15.2.2 Red N-1 Caso 1.- Changos – Parinas 500kV

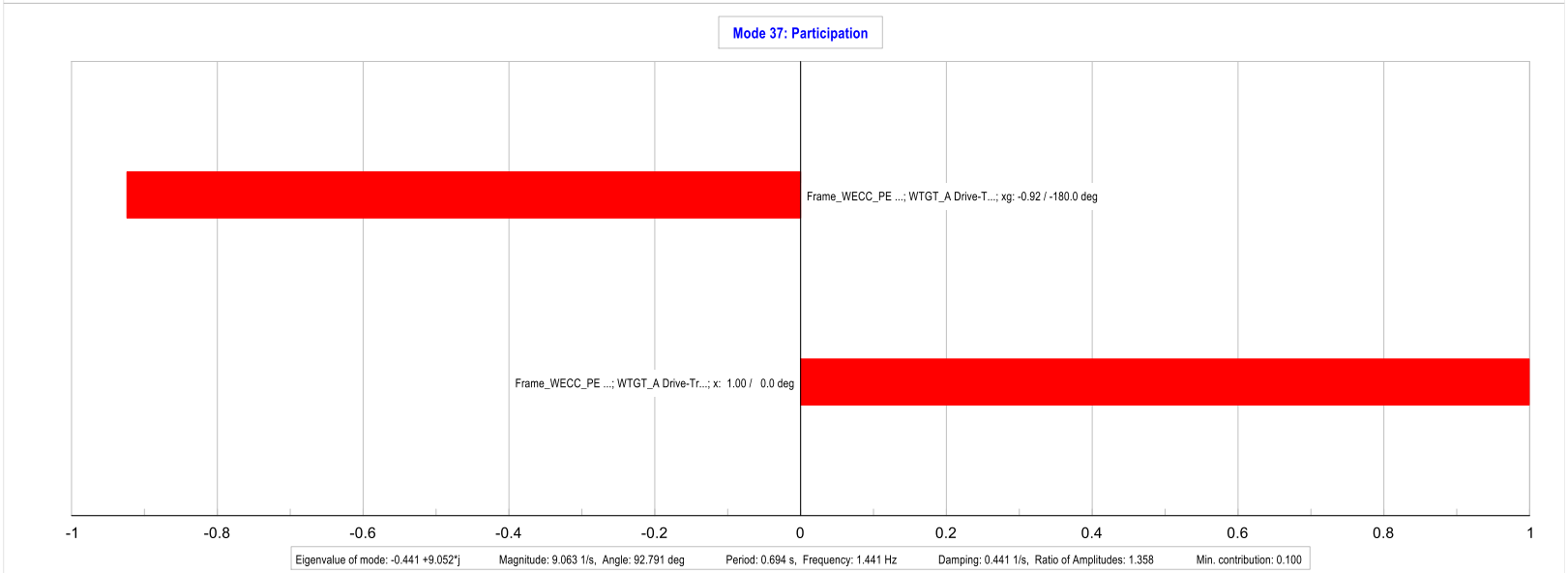


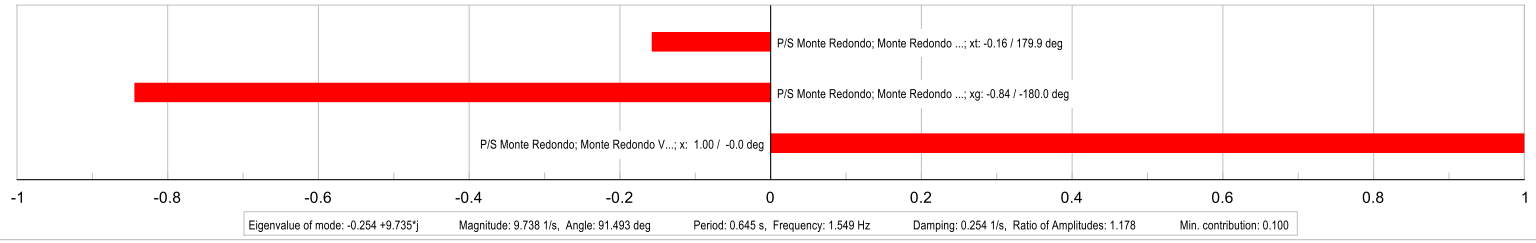


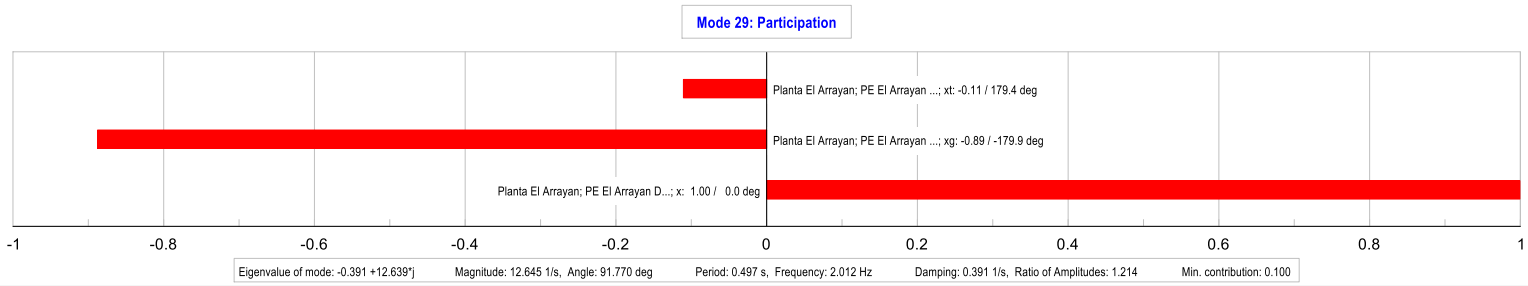


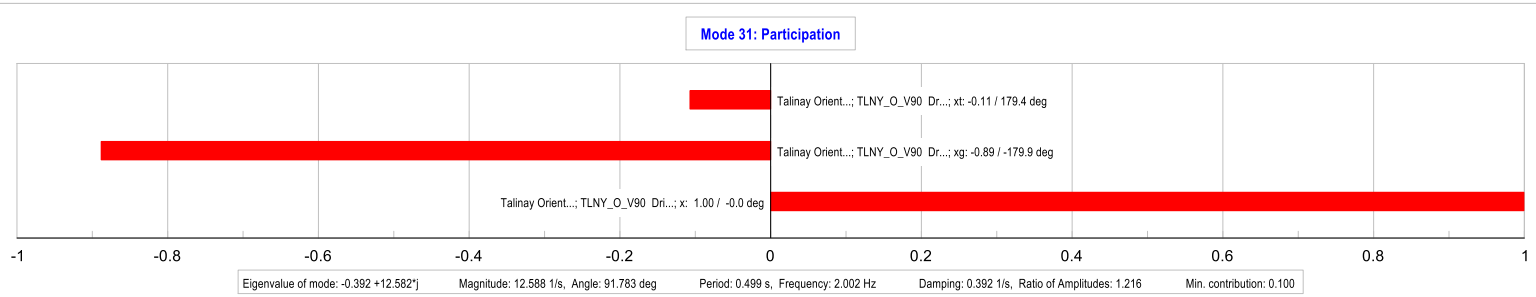


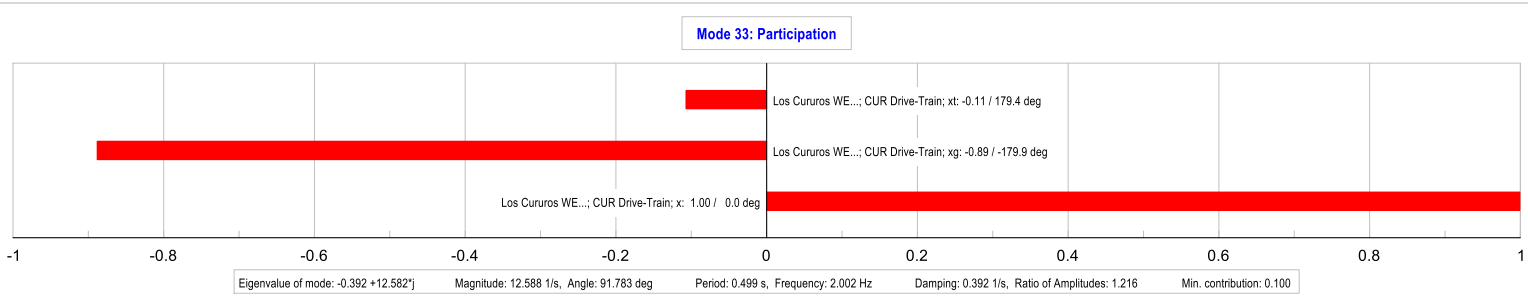

Mode 17: Participation
PE Sarco WTG...; Two mass model; xHgen: -0.66 / -180.0 deg
PE Sarco WTG...; Two mass model; xHWTR: -0.22 / 179.8 deg
PE Sarco WTG C...; Two mass model; x: 1.00 / 0.0 deg
P/S PE Sarco; WP Active Powe...; xp: -0.09 / -147.4 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.282 +8.370*j
Magnitude: 8.374 1/s, Angle: 91.927 deg
Period: 0.751 s, Frequency: 1.332 Hz
Damping: 0.282 1/s, Ratio of Amplitudes: 1.235
Min. contribution: 0.100


Mode 37: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -180.0 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.441 +9.052*j
Magnitude: 9.063 1/s, Angle: 92.791 deg
Period: 0.694 s, Frequency: 1.441 Hz
Damping: 0.441 1/s, Ratio of Amplitudes: 1.358
Min. contribution: 0.100

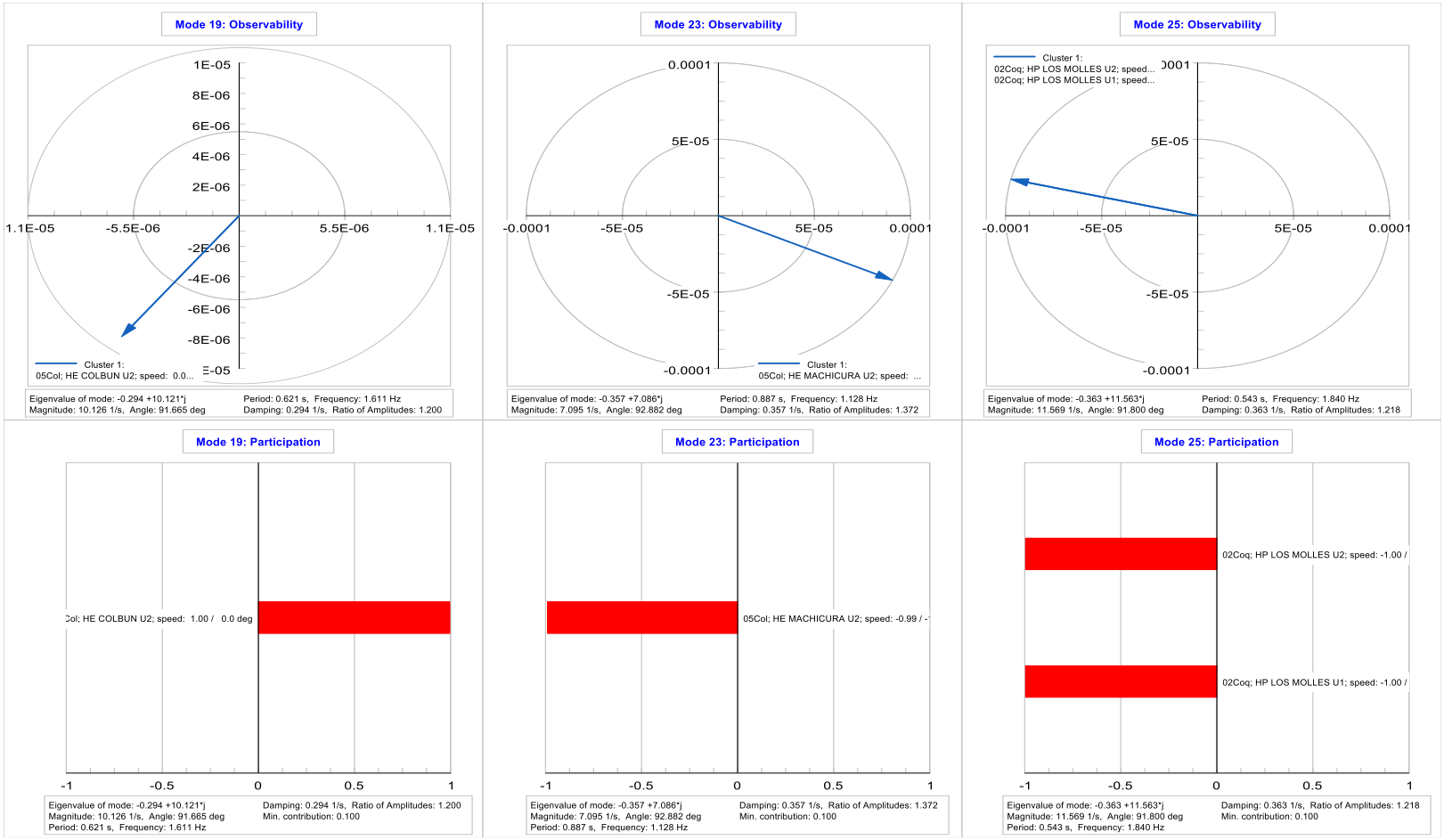

Mode 15: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.9 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.84 / -180.0 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.254 +9.735*j
Magnitude: 9.738 1/s, Angle: 91.493 deg
Period: 0.645 s, Frequency: 1.549 Hz
Damping: 0.254 1/s, Ratio of Amplitudes: 1.178
Min. contribution: 0.100

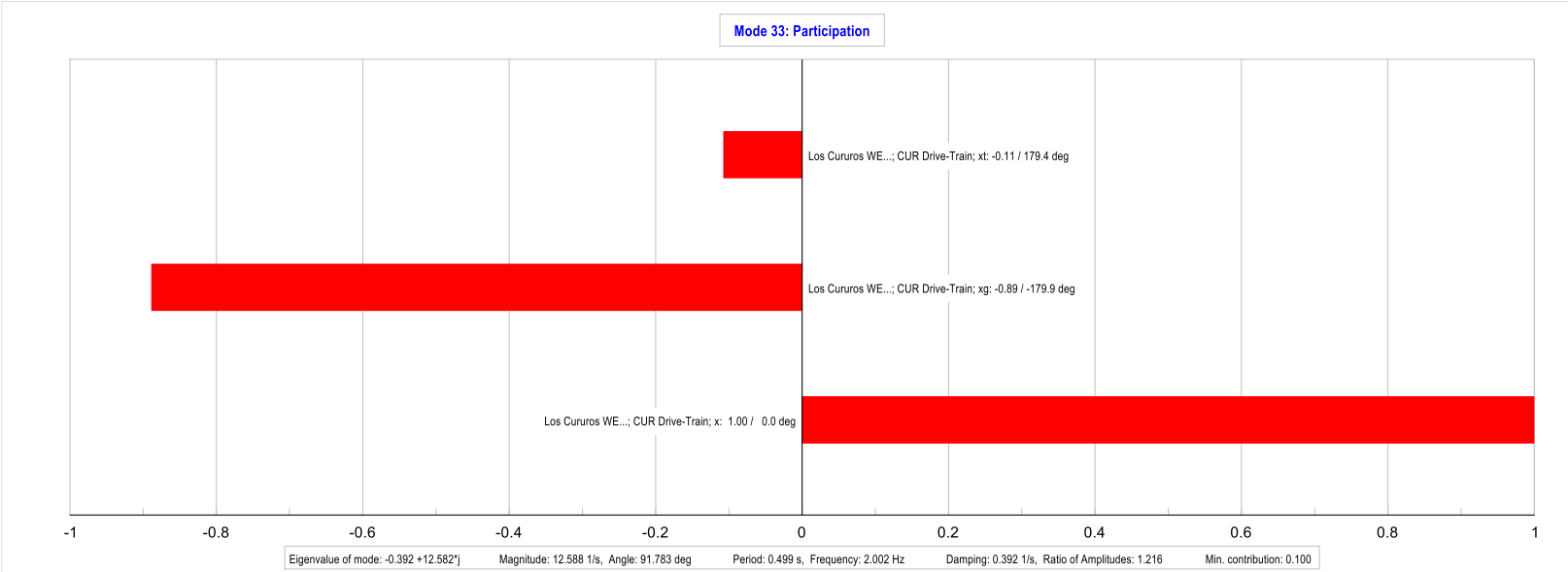

Mode 29: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 179.4 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.89 / -179.9 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.391 +12.639*j
Magnitude: 12.645 1/s, Angle: 91.770 deg
Period: 0.497 s, Frequency: 2.012 Hz
Damping: 0.391 1/s, Ratio of Amplitudes: 1.214
Min. contribution: 0.100

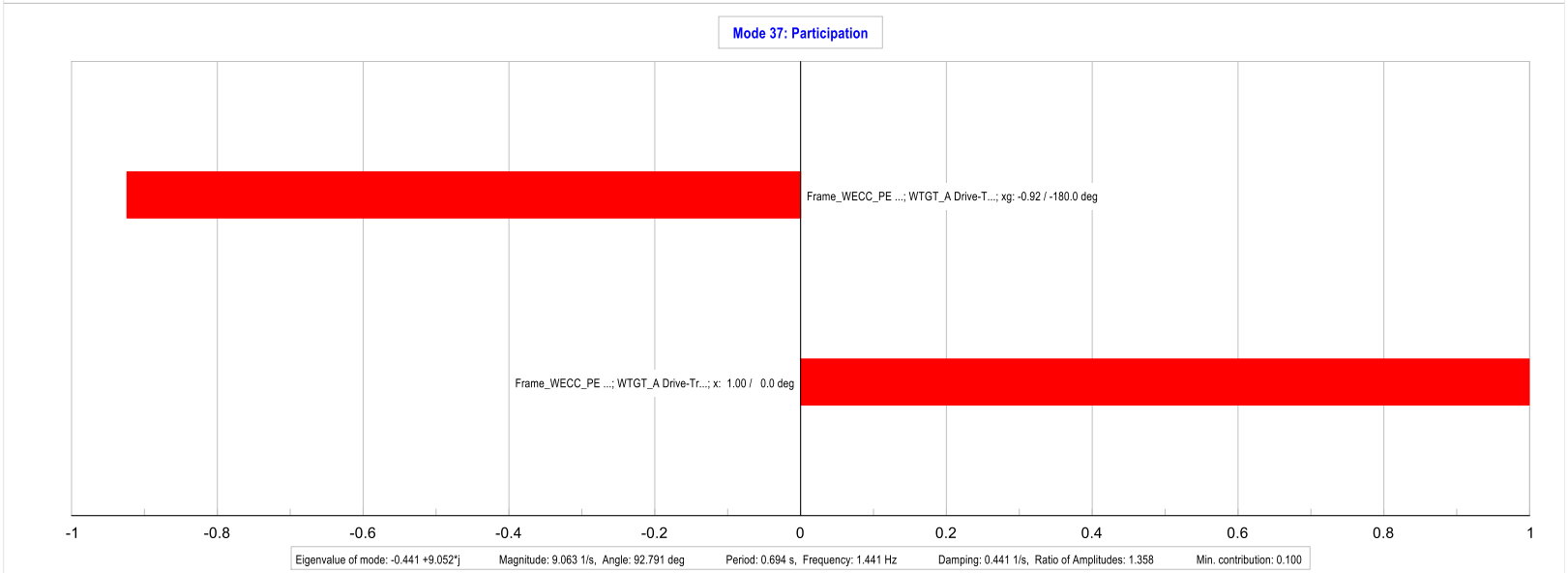

Mode 31: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 179.4 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.89 / -179.9 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100

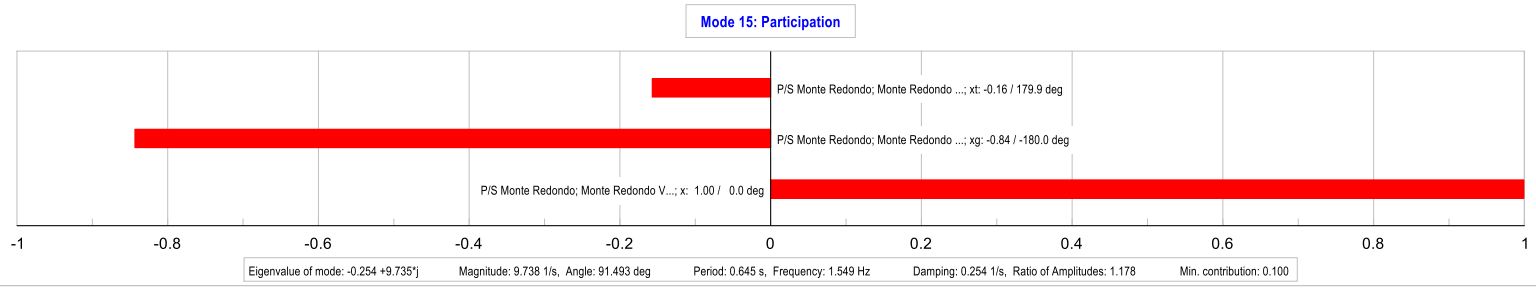

Mode 33: Participation
Los Cururos WE...; CUR Drive-Train; xt: -0.11 / 179.4 deg
Los Cururos WE...; CUR Drive-Train; xg: -0.89 / -179.9 deg
Los Cururos WE...; CUR Drive-Train; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100

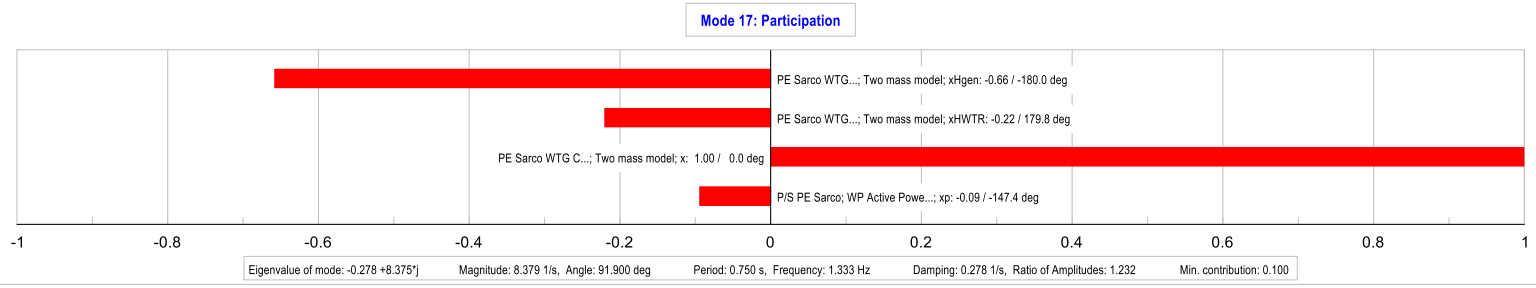
15.2.3 Red N-1 Caso 2:- Nueva Pan de Azúcar – Polpaico 500kV

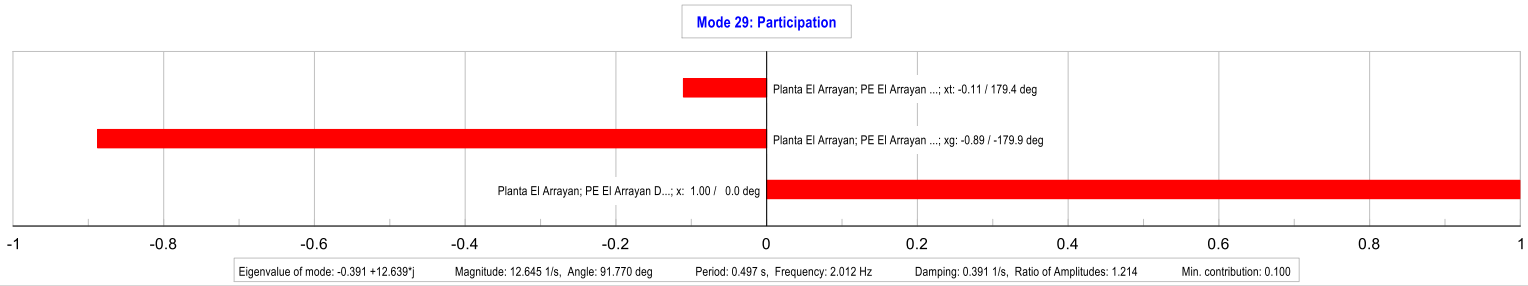


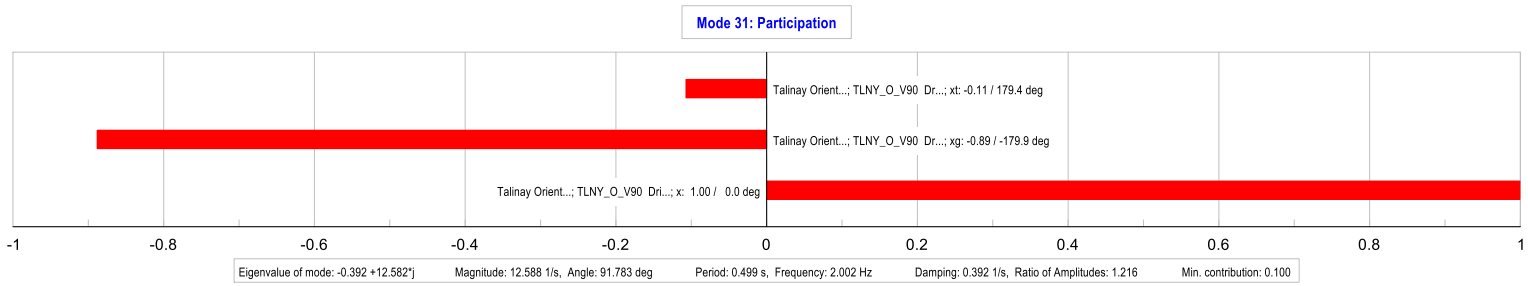

Mode 33: Participation
Los Cururos WE...; CUR Drive-Train; xt: -0.11 / 179.4 deg
Los Cururos WE...; CUR Drive-Train; xg: -0.89 / -179.9 deg
Los Cururos WE...; CUR Drive-Train; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100


Mode 37: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -180.0 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.441 +9.052*j
Magnitude: 9.063 1/s, Angle: 92.791 deg
Period: 0.694 s, Frequency: 1.441 Hz
Damping: 0.441 1/s, Ratio of Amplitudes: 1.358
Min. contribution: 0.100

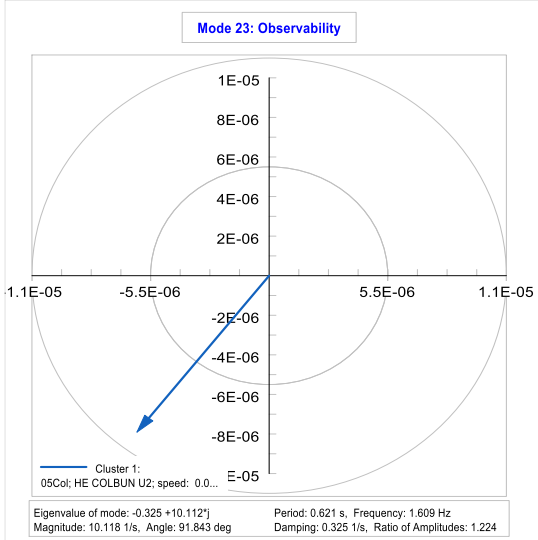

Mode 15: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.9 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.84 / -180.0 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.254 +9.735*j
Magnitude: 9.738 1/s, Angle: 91.493 deg
Period: 0.645 s, Frequency: 1.549 Hz
Damping: 0.254 1/s, Ratio of Amplitudes: 1.178
Min. contribution: 0.100

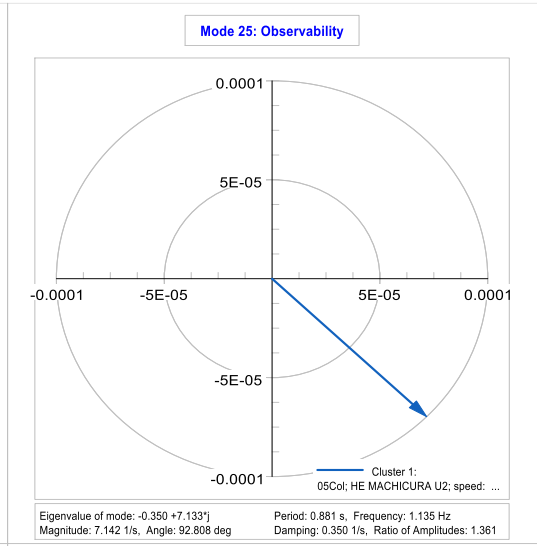

Mode 17: Participation
PE Sarco WTG...; Two mass model; xHgen: -0.66 / -180.0 deg
PE Sarco WTG...; Two mass model; xHWTR: -0.22 / 179.8 deg
PE Sarco WTG C...; Two mass model; x: 1.00 / 0.0 deg
P/S PE Sarco; WP Active Powe...; xp: -0.09 / -147.4 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.278 +8.375*j
Magnitude: 8.379 1/s, Angle: 91.900 deg
Period: 0.750 s, Frequency: 1.333 Hz
Damping: 0.278 1/s, Ratio of Amplitudes: 1.232
Min. contribution: 0.100

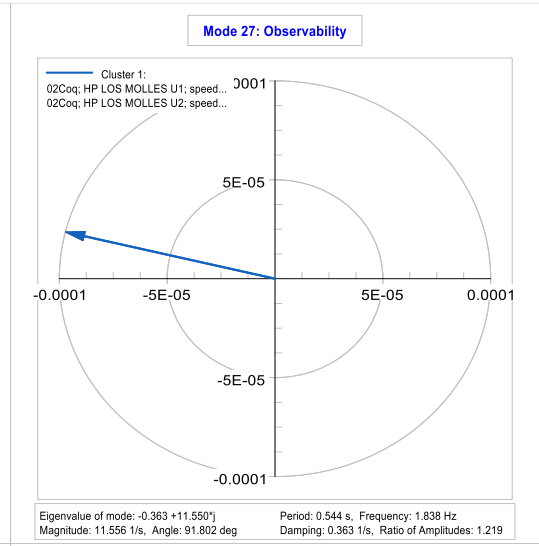

Mode 29: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 179.4 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.89 / -179.9 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.391 +12.639*j
Magnitude: 12.645 1/s, Angle: 91.770 deg
Period: 0.497 s, Frequency: 2.012 Hz
Damping: 0.391 1/s, Ratio of Amplitudes: 1.214
Min. contribution: 0.100

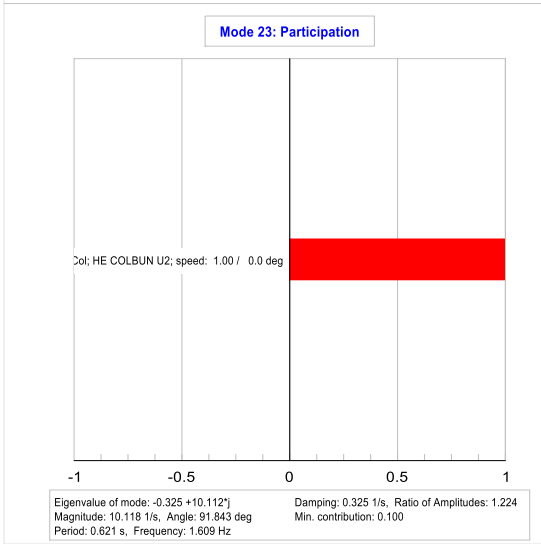

Mode 31: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 179.4 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.89 / -179.9 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100

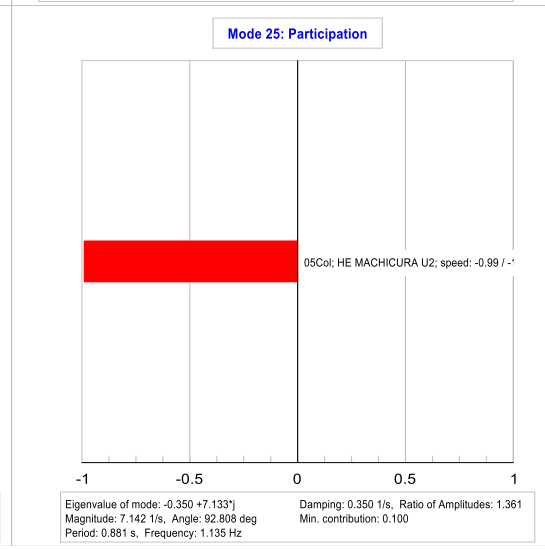
15.2.4 Red N-1 Caso 3.- Charrúa – Ancoa 500kV

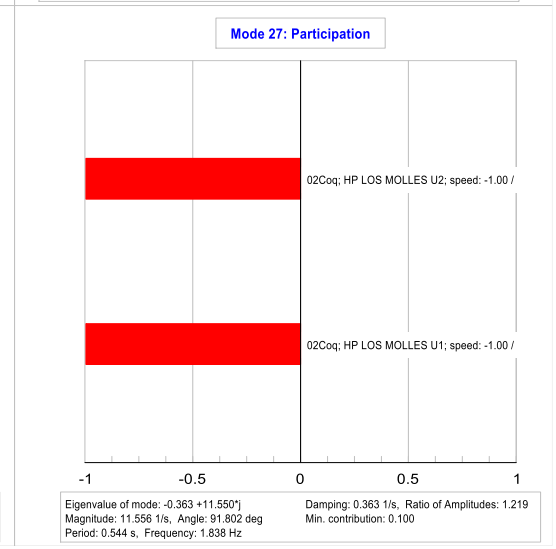


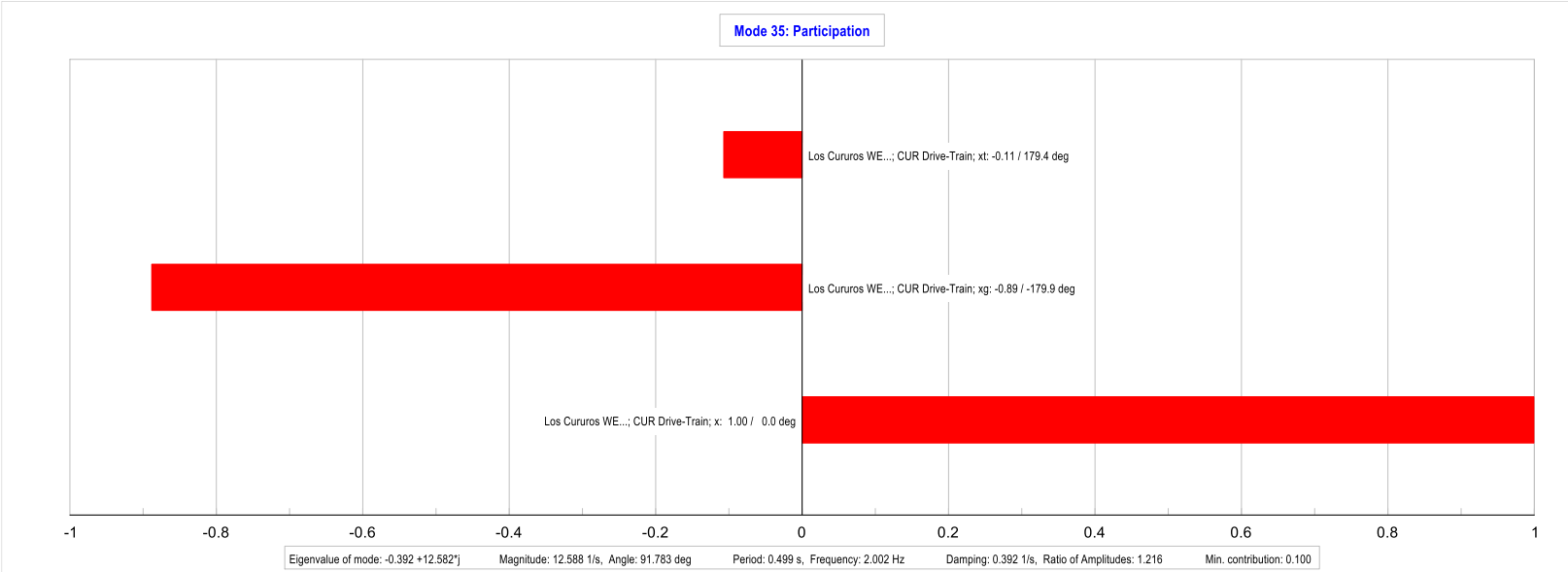


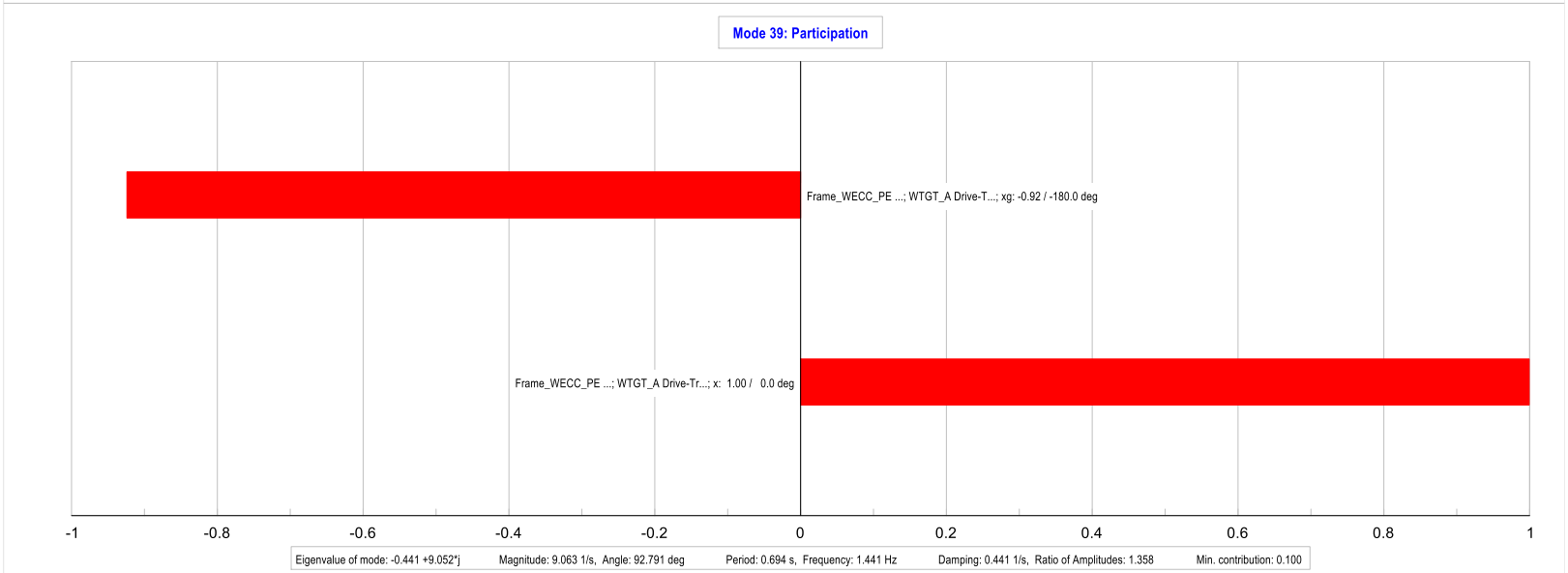


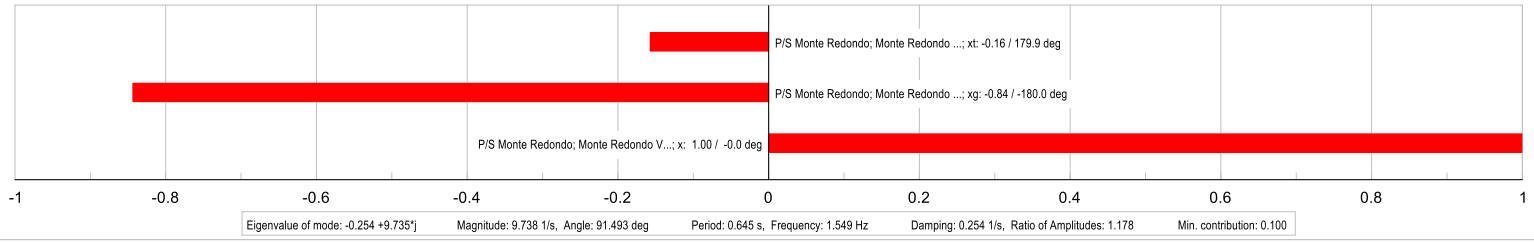


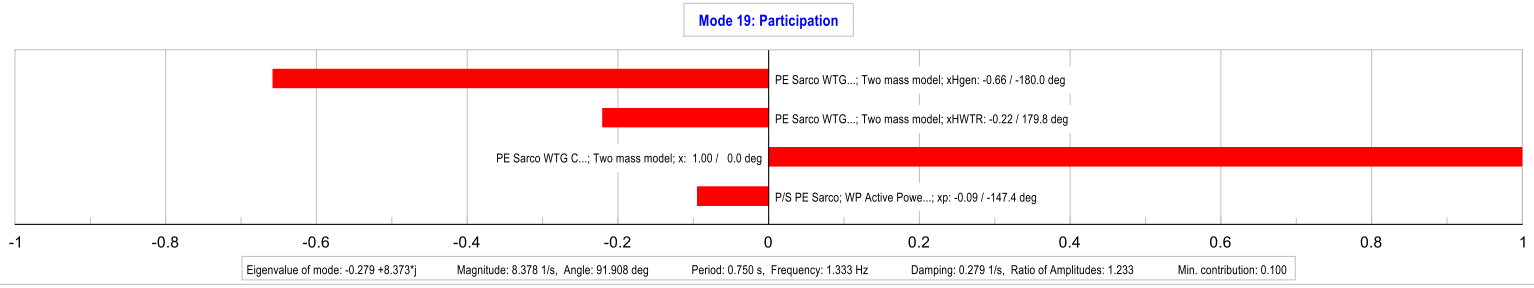


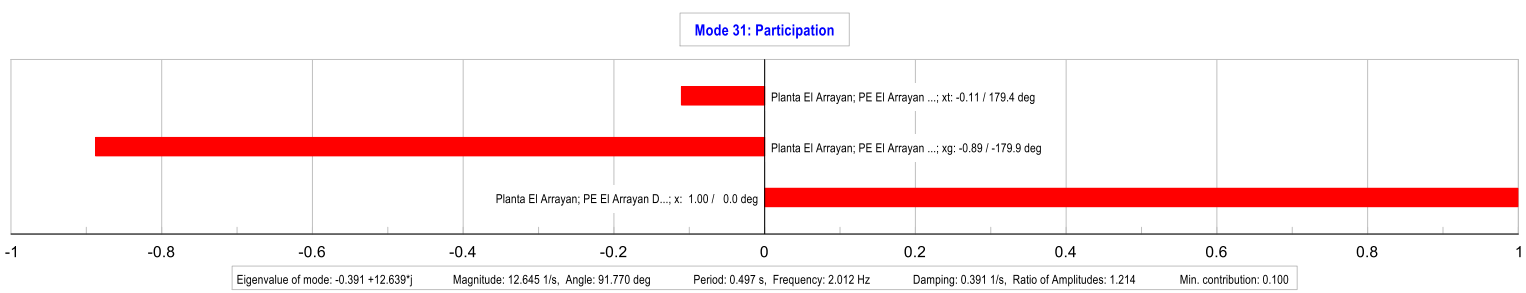


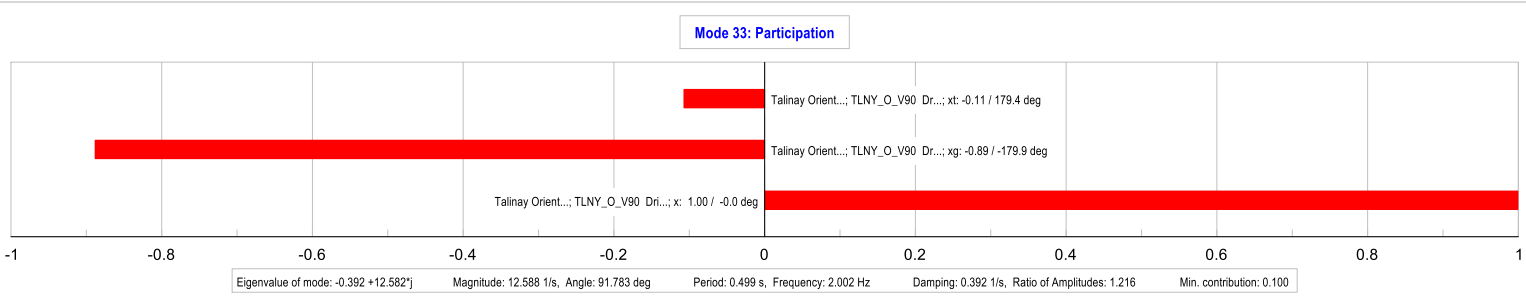

Mode 35: Participation
Los Cururos WE...; CUR Drive-Train; xt: -0.11 / 179.4 deg
Los Cururos WE...; CUR Drive-Train; xg: -0.89 / -179.9 deg
Los Cururos WE...; CUR Drive-Train; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100


Mode 39: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -180.0 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.441 +9.052*j
Magnitude: 9.063 1/s, Angle: 92.791 deg
Period: 0.694 s, Frequency: 1.441 Hz
Damping: 0.441 1/s, Ratio of Amplitudes: 1.358
Min. contribution: 0.100


Mode 17: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.9 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.84 / -180.0 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.254 +9.735*j
Magnitude: 9.738 1/s, Angle: 91.493 deg
Period: 0.645 s, Frequency: 1.549 Hz
Damping: 0.254 1/s, Ratio of Amplitudes: 1.178
Min. contribution: 0.100

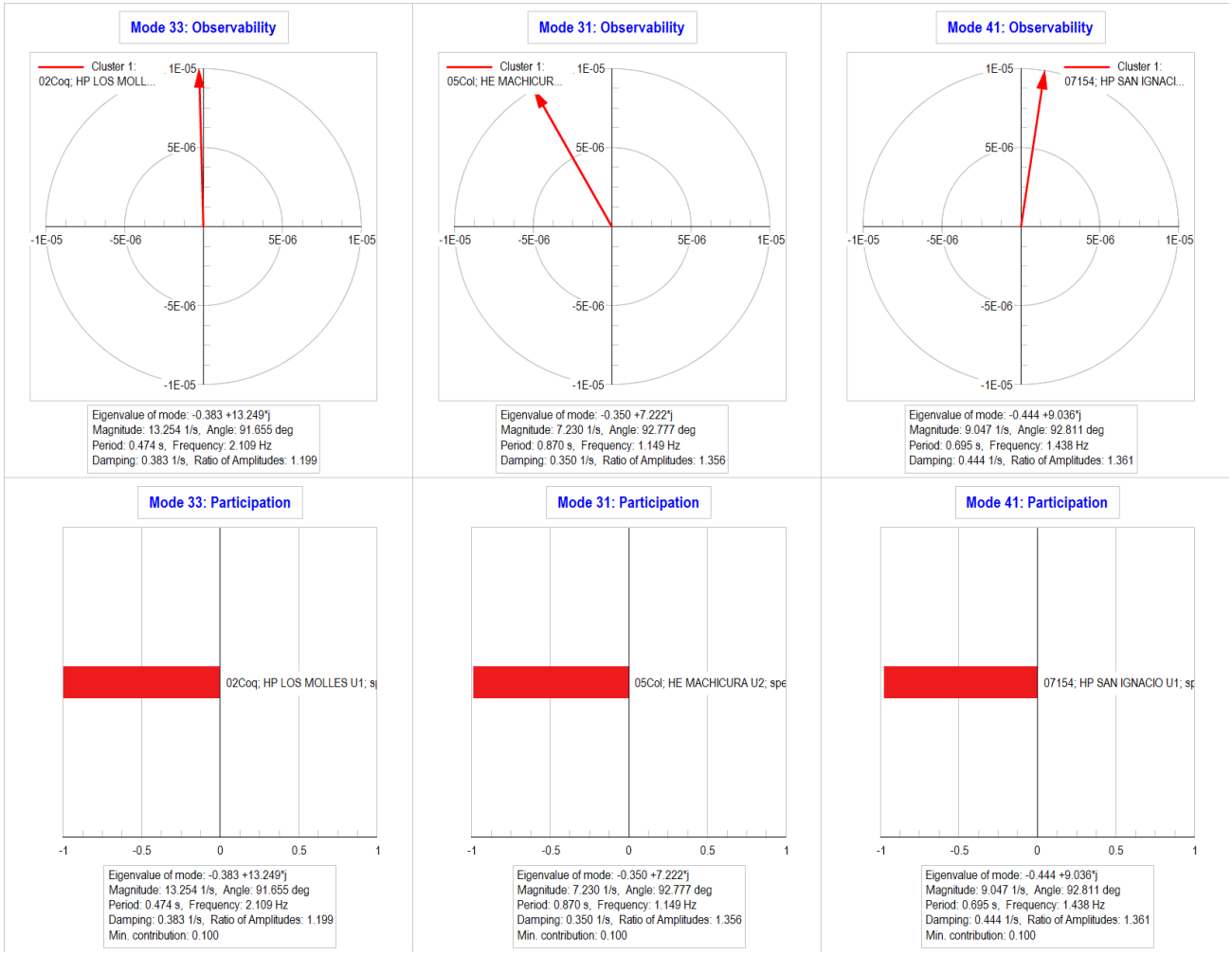

Mode 19: Participation
PE Sarco WTG...; Two mass model; xHgen: -0.66 / -180.0 deg
PE Sarco WTG...; Two mass model; xHWTR: -0.22 / 179.8 deg
PE Sarco WTG C...; Two mass model; x: 1.00 / 0.0 deg
P/S PE Sarco; WP Active Powe...; xp: -0.09 / -147.4 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.279 +8.373*j
Magnitude: 8.378 1/s, Angle: 91.908 deg
Period: 0.750 s, Frequency: 1.333 Hz
Damping: 0.279 1/s, Ratio of Amplitudes: 1.233
Min. contribution: 0.100


Mode 31: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 179.4 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.89 / -179.9 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.391 +12.639*j
Magnitude: 12.645 1/s, Angle: 91.770 deg
Period: 0.497 s, Frequency: 2.012 Hz
Damping: 0.391 1/s, Ratio of Amplitudes: 1.214
Min. contribution: 0.100

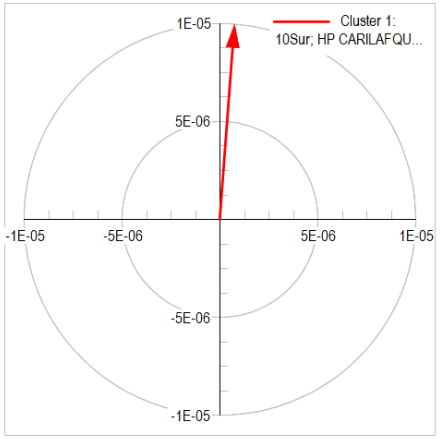

Mode 33: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 179.4 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.89 / -179.9 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.392 +12.582*j
Magnitude: 12.588 1/s, Angle: 91.783 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.392 1/s, Ratio of Amplitudes: 1.216
Min. contribution: 0.100

15.3 Escenario E3 DB día Abr2024

15.3.1 Red N

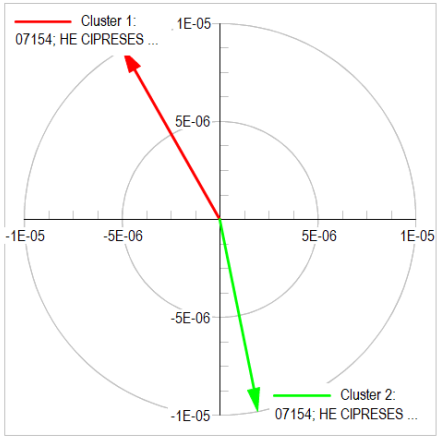


Mode 19: Observability



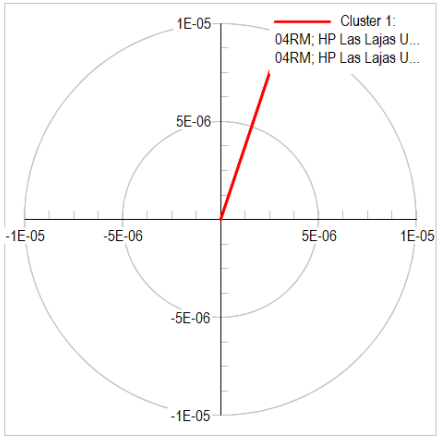
Eigenvalue of mode: -0.264 +5.360*j
Magnitude: 5.367 1/s, Angle: 92.821 deg
Period: 1.172 s, Frequency: 0.853 Hz
Damping: 0.264 1/s, Ratio of Amplitudes: 1.363

Mode 35: Observability



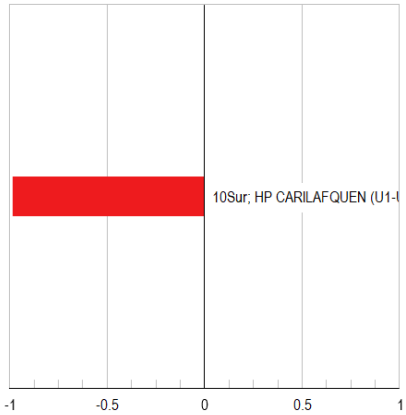
Eigenvalue of mode: -0.401 +7.845*j
Magnitude: 7.855 1/s, Angle: 92.926 deg
Period: 0.801 s, Frequency: 1.248 Hz
Damping: 0.401 1/s, Ratio of Amplitudes: 1.379

Mode 29: Observability



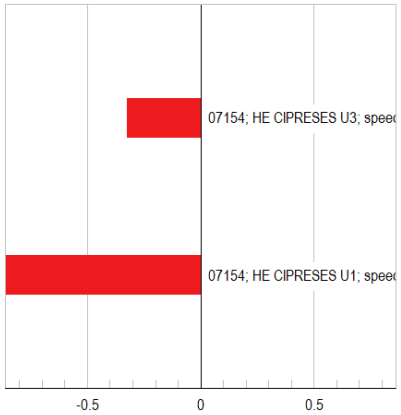
Eigenvalue of mode: -0.310 +5.188*j
Magnitude: 5.197 1/s, Angle: 93.420 deg
Period: 1.211 s, Frequency: 0.826 Hz
Damping: 0.310 1/s, Ratio of Amplitudes: 1.456

Mode 19: Participation



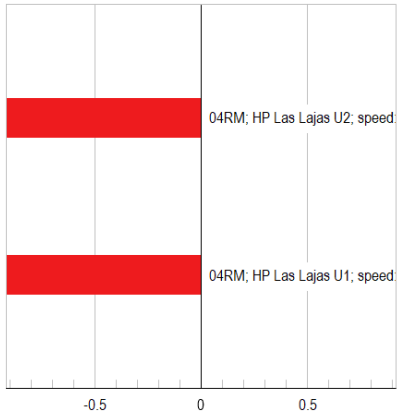
Eigenvalue of mode: -0.264 +5.360*j
Magnitude: 5.367 1/s, Angle: 92.821 deg
Period: 1.172 s, Frequency: 0.853 Hz
Damping: 0.264 1/s, Ratio of Amplitudes: 1.363
Min. contribution: 0.100

Mode 35: Participation



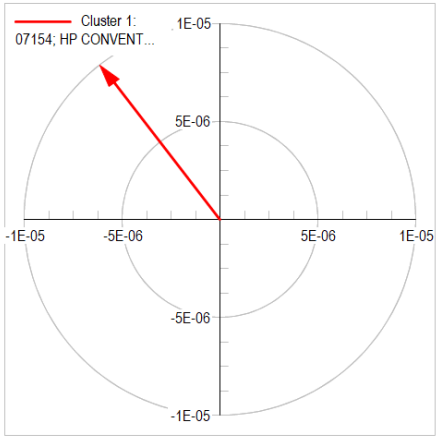
Eigenvalue of mode: -0.401 +7.845*j
Magnitude: 7.855 1/s, Angle: 92.926 deg
Period: 0.801 s, Frequency: 1.248 Hz
Damping: 0.401 1/s, Ratio of Amplitudes: 1.379
Min. contribution: 0.100

Mode 29: Participation



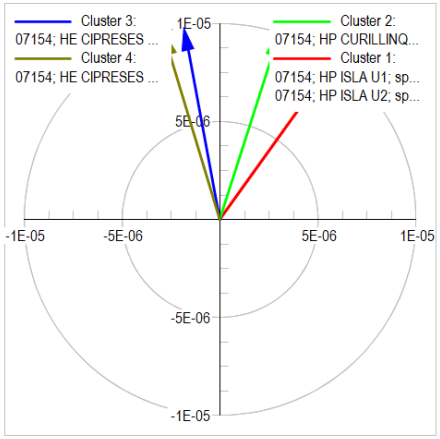
Eigenvalue of mode: -0.310 +5.188*j
Magnitude: 5.197 1/s, Angle: 93.420 deg
Period: 1.211 s, Frequency: 0.826 Hz
Damping: 0.310 1/s, Ratio of Amplitudes: 1.456
Min. contribution: 0.100

Mode 107: Observability



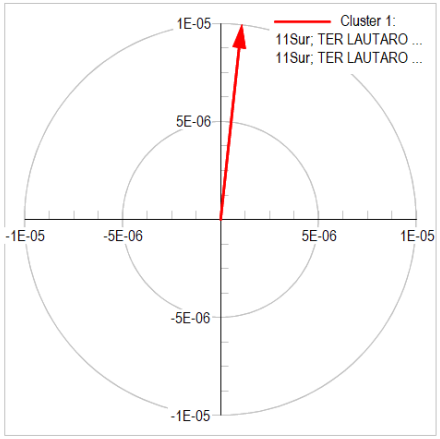
Eigenvalue of mode: -1.079 +16.261*j
Magnitude: 16.297 1/s, Angle: 93.796 deg
Period: 0.386 s, Frequency: 2.588 Hz
Damping: 1.079 1/s, Ratio of Amplitudes: 1.517

Mode 45: Observability



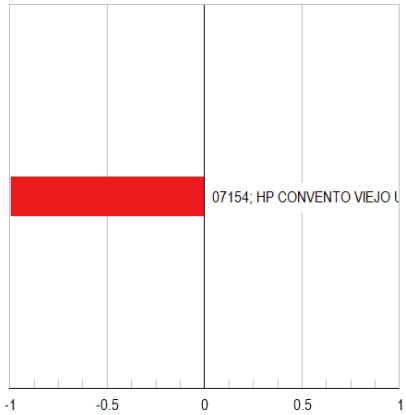
Eigenvalue of mode: -0.469 +6.953*j
Magnitude: 6.969 1/s, Angle: 93.858 deg
Period: 0.904 s, Frequency: 1.107 Hz
Damping: 0.469 1/s, Ratio of Amplitudes: 1.528

Mode 65: Observability



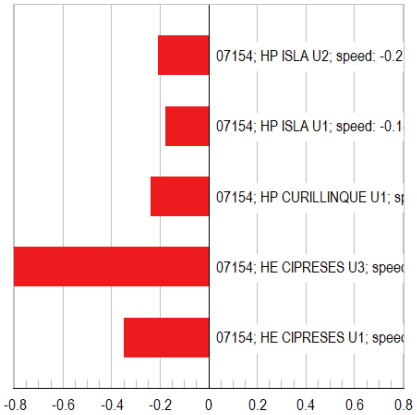
Eigenvalue of mode: -0.743 +10.280*j
Magnitude: 10.307 1/s, Angle: 94.136 deg
Period: 0.611 s, Frequency: 1.636 Hz
Damping: 0.743 1/s, Ratio of Amplitudes: 1.575

Mode 107: Participation



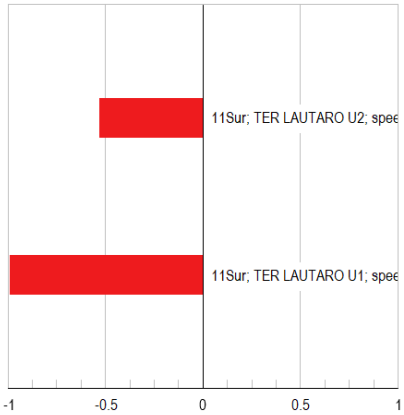
Eigenvalue of mode: -1.079 +16.261*j
Magnitude: 16.297 1/s, Angle: 93.796 deg
Period: 0.386 s, Frequency: 2.588 Hz
Damping: 1.079 1/s, Ratio of Amplitudes: 1.517
Min. contribution: 0.100

Mode 45: Participation



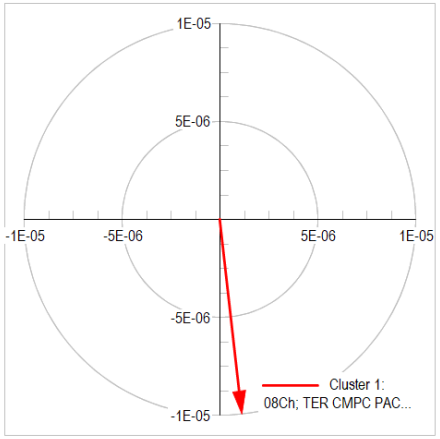
Eigenvalue of mode: -0.469 +6.953*j
Magnitude: 6.969 1/s, Angle: 93.858 deg
Period: 0.904 s, Frequency: 1.107 Hz
Damping: 0.469 1/s, Ratio of Amplitudes: 1.528
Min. contribution: 0.100

Mode 65: Participation



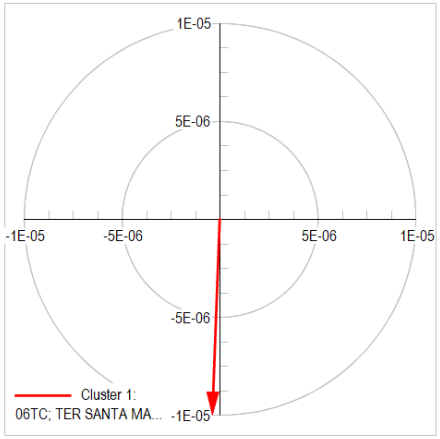
Eigenvalue of mode: -0.743 +10.280*j
Magnitude: 10.307 1/s, Angle: 94.136 deg
Period: 0.611 s, Frequency: 1.636 Hz
Damping: 0.743 1/s, Ratio of Amplitudes: 1.575
Min. contribution: 0.100

Mode 67: Observability



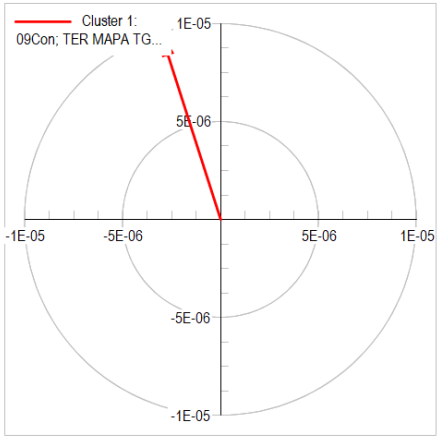
Eigenvalue of mode: -0.744 +9.160*j
Magnitude: 9.190 1/s, Angle: 94.642 deg
Period: 0.686 s, Frequency: 1.458 Hz
Damping: 0.744 1/s, Ratio of Amplitudes: 1.666

Mode 101: Observability



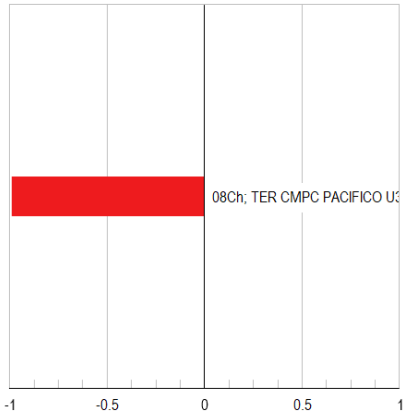
Eigenvalue of mode: -1.065 +12.999*j
Magnitude: 13.043 1/s, Angle: 94.685 deg
Period: 0.483 s, Frequency: 2.069 Hz
Damping: 1.065 1/s, Ratio of Amplitudes: 1.673

Mode 155: Observability



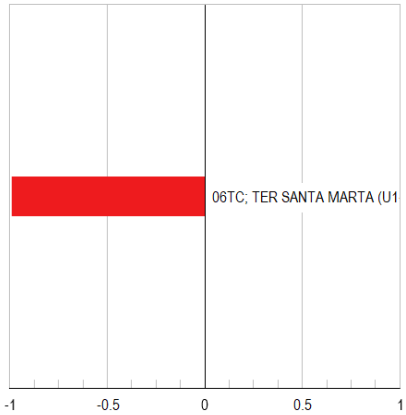
Eigenvalue of mode: -1.442 +17.120*j
Magnitude: 17.181 1/s, Angle: 94.815 deg
Period: 0.367 s, Frequency: 2.725 Hz
Damping: 1.442 1/s, Ratio of Amplitudes: 1.698

Mode 67: Participation



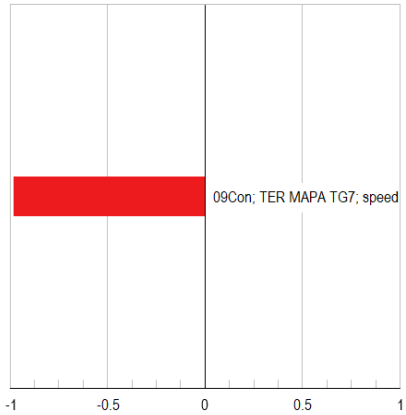
Eigenvalue of mode: -0.744 +9.160*j
Magnitude: 9.190 1/s, Angle: 94.642 deg
Period: 0.686 s, Frequency: 1.458 Hz
Damping: 0.744 1/s, Ratio of Amplitudes: 1.666
Min. contribution: 0.100

Mode 101: Participation



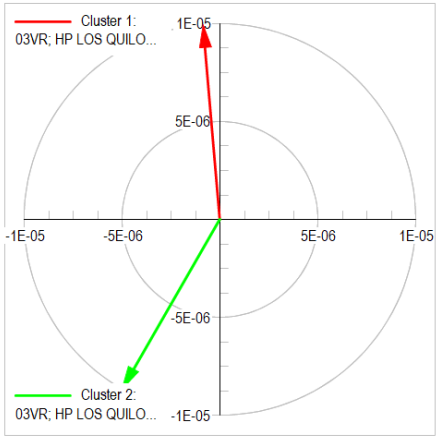
Eigenvalue of mode: -1.065 +12.999*j
Magnitude: 13.043 1/s, Angle: 94.685 deg
Period: 0.483 s, Frequency: 2.069 Hz
Damping: 1.065 1/s, Ratio of Amplitudes: 1.673
Min. contribution: 0.100

Mode 155: Participation



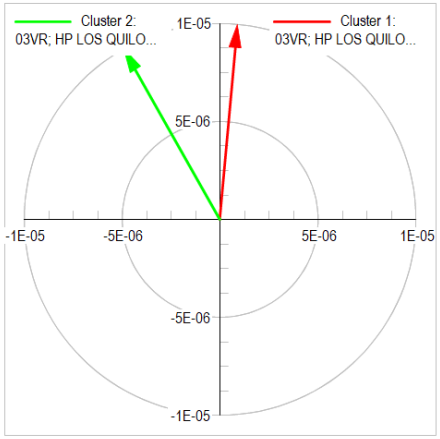
Eigenvalue of mode: -1.442 +17.120*j
Magnitude: 17.181 1/s, Angle: 94.815 deg
Period: 0.367 s, Frequency: 2.725 Hz
Damping: 1.442 1/s, Ratio of Amplitudes: 1.698
Min. contribution: 0.100

Mode 83: Observability



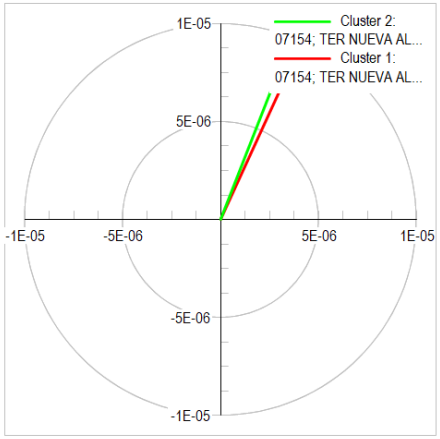
Eigenvalue of mode: -0.874 +10.332*j
Magnitude: 10.369 1/s, Angle: 94.836 deg
Period: 0.608 s, Frequency: 1.644 Hz
Damping: 0.874 1/s, Ratio of Amplitudes: 1.702

Mode 81: Observability



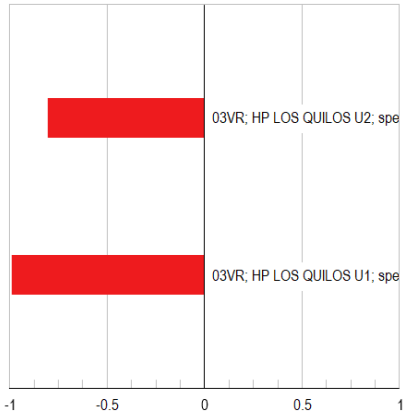
Eigenvalue of mode: -0.868 +10.153*j
Magnitude: 10.190 1/s, Angle: 94.888 deg
Period: 0.619 s, Frequency: 1.616 Hz
Damping: 0.868 1/s, Ratio of Amplitudes: 1.711

Mode 37: Observability



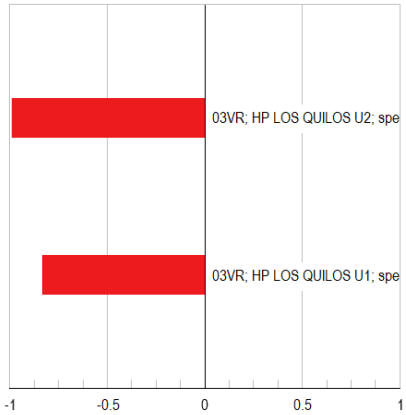
Eigenvalue of mode: -0.422 +4.828*j
Magnitude: 4.847 1/s, Angle: 94.992 deg
Period: 1.301 s, Frequency: 0.768 Hz
Damping: 0.422 1/s, Ratio of Amplitudes: 1.731

Mode 83: Participation



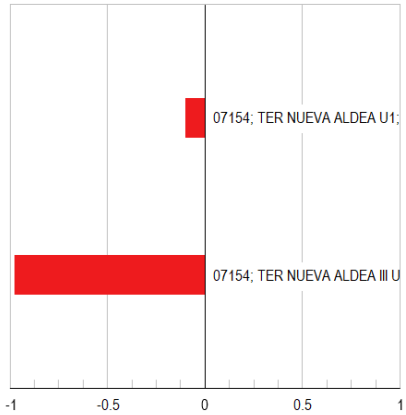
Eigenvalue of mode: -0.874 +10.332*j
Magnitude: 10.369 1/s, Angle: 94.836 deg
Period: 0.608 s, Frequency: 1.644 Hz
Damping: 0.874 1/s, Ratio of Amplitudes: 1.702
Min. contribution: 0.100

Mode 81: Participation



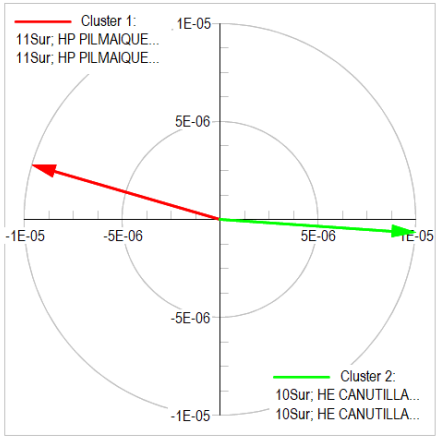
Eigenvalue of mode: -0.868 +10.153*j
Magnitude: 10.190 1/s, Angle: 94.888 deg
Period: 0.619 s, Frequency: 1.616 Hz
Damping: 0.868 1/s, Ratio of Amplitudes: 1.711
Min. contribution: 0.100

Mode 37: Participation



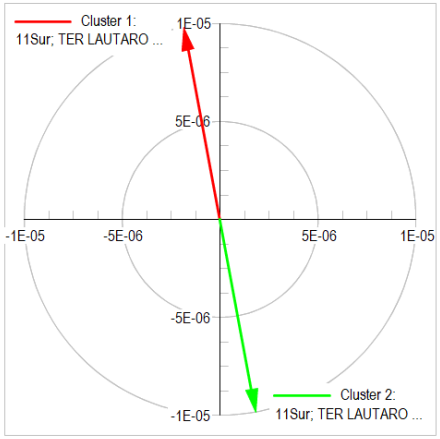
Eigenvalue of mode: -0.422 +4.828*j
Magnitude: 4.847 1/s, Angle: 94.992 deg
Period: 1.301 s, Frequency: 0.768 Hz
Damping: 0.422 1/s, Ratio of Amplitudes: 1.731
Min. contribution: 0.100

Mode 85: Observability



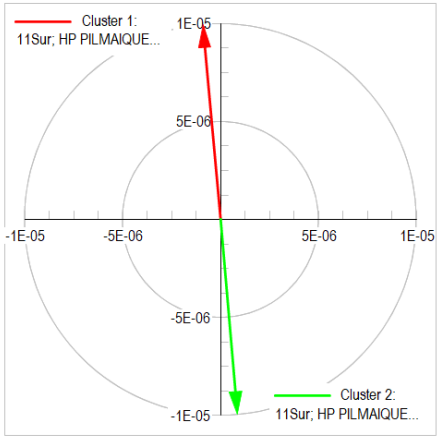
Eigenvalue of mode: -0.894 +10.209*j
Magnitude: 10.248 1/s, Angle: 95.005 deg
Period: 0.615 s, Frequency: 1.625 Hz
Damping: 0.894 1/s, Ratio of Amplitudes: 1.734

Mode 99: Observability



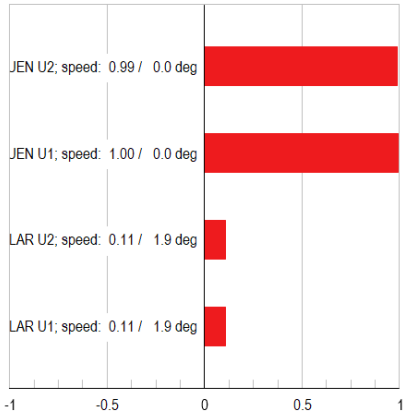
Eigenvalue of mode: -1.061 +12.007*j
Magnitude: 12.054 1/s, Angle: 95.051 deg
Period: 0.523 s, Frequency: 1.911 Hz
Damping: 1.061 1/s, Ratio of Amplitudes: 1.743

Mode 89: Observability



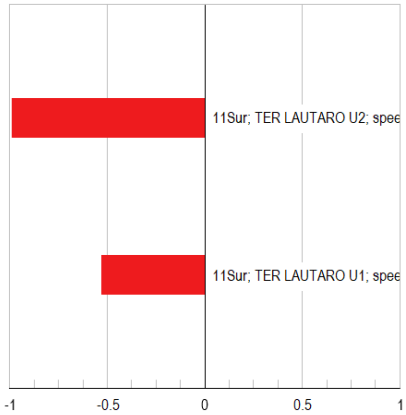
Eigenvalue of mode: -0.939 +10.387*j
Magnitude: 10.429 1/s, Angle: 95.165 deg
Period: 0.605 s, Frequency: 1.653 Hz
Damping: 0.939 1/s, Ratio of Amplitudes: 1.765

Mode 85: Participation



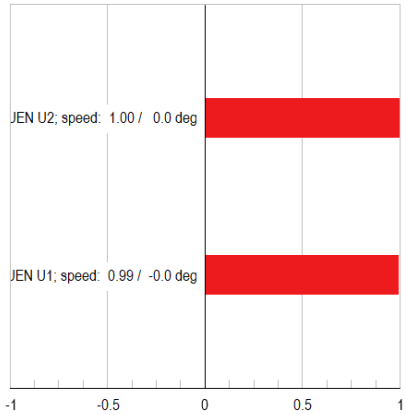
Eigenvalue of mode: -0.894 +10.209*j
Magnitude: 10.248 1/s, Angle: 95.005 deg
Period: 0.615 s, Frequency: 1.625 Hz
Damping: 0.894 1/s, Ratio of Amplitudes: 1.734
Min. contribution: 0.100

Mode 99: Participation



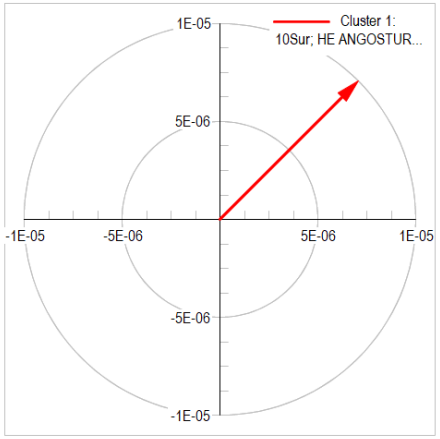
Eigenvalue of mode: -1.061 +12.007*j
Magnitude: 12.054 1/s, Angle: 95.051 deg
Period: 0.523 s, Frequency: 1.911 Hz
Damping: 1.061 1/s, Ratio of Amplitudes: 1.743
Min. contribution: 0.100

Mode 89: Participation



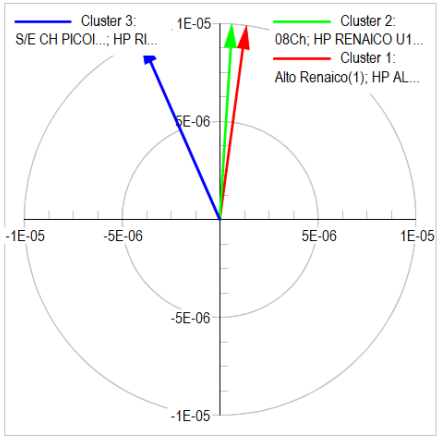
Eigenvalue of mode: -0.939 +10.387*j
Magnitude: 10.429 1/s, Angle: 95.165 deg
Period: 0.605 s, Frequency: 1.653 Hz
Damping: 0.939 1/s, Ratio of Amplitudes: 1.765
Min. contribution: 0.100

Mode 39: Observability



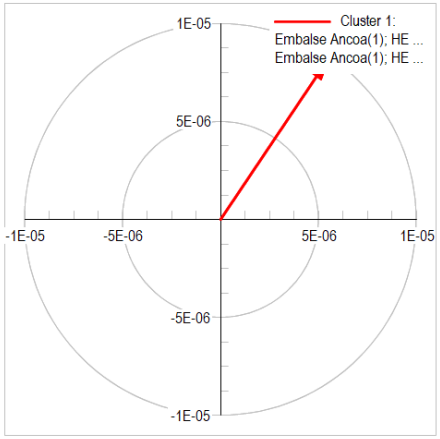
Eigenvalue of mode: -0.432 +4.759*j
Magnitude: 4.778 1/s, Angle: 95.184 deg
Period: 1.320 s, Frequency: 0.757 Hz
Damping: 0.432 1/s, Ratio of Amplitudes: 1.768

Mode 181: Observability



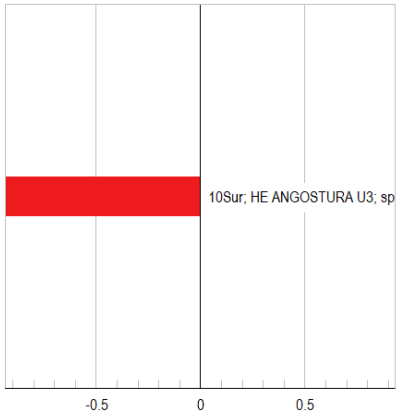
Eigenvalue of mode: -1.691 +18.018*j
Magnitude: 18.098 1/s, Angle: 95.363 deg
Period: 0.349 s, Frequency: 2.868 Hz
Damping: 1.691 1/s, Ratio of Amplitudes: 1.804

Mode 63: Observability



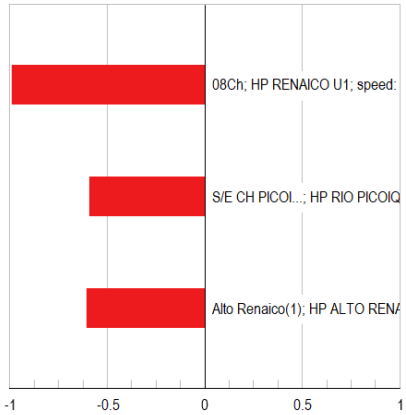
Eigenvalue of mode: -0.740 +7.801*j
Magnitude: 7.836 1/s, Angle: 95.422 deg
Period: 0.805 s, Frequency: 1.242 Hz
Damping: 0.740 1/s, Ratio of Amplitudes: 1.816

Mode 39: Participation



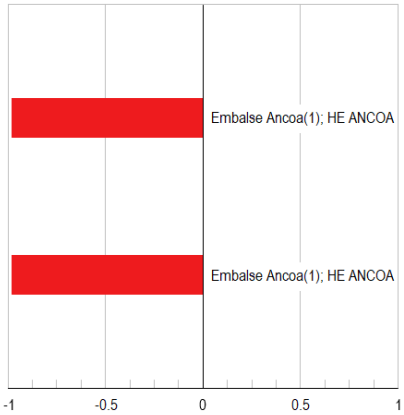
Eigenvalue of mode: -0.432 +4.759*j
Magnitude: 4.778 1/s, Angle: 95.184 deg
Period: 1.320 s, Frequency: 0.757 Hz
Damping: 0.432 1/s, Ratio of Amplitudes: 1.768
Min. contribution: 0.100

Mode 181: Participation



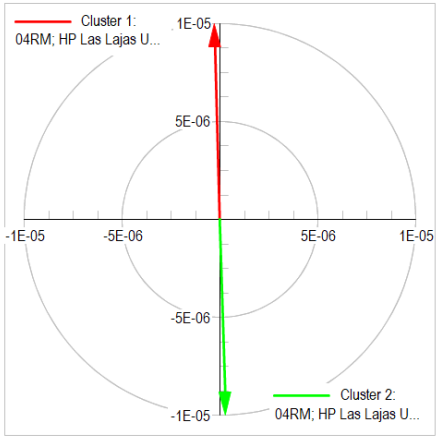
Eigenvalue of mode: -1.691 +18.018*j
Magnitude: 18.098 1/s, Angle: 95.363 deg
Period: 0.349 s, Frequency: 2.868 Hz
Damping: 1.691 1/s, Ratio of Amplitudes: 1.804
Min. contribution: 0.100

Mode 63: Participation



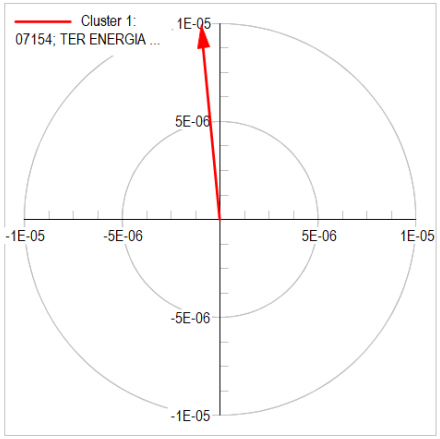
Eigenvalue of mode: -0.740 +7.801*j
Magnitude: 7.836 1/s, Angle: 95.422 deg
Period: 0.805 s, Frequency: 1.242 Hz
Damping: 0.740 1/s, Ratio of Amplitudes: 1.816
Min. contribution: 0.100

Mode 43: Observability



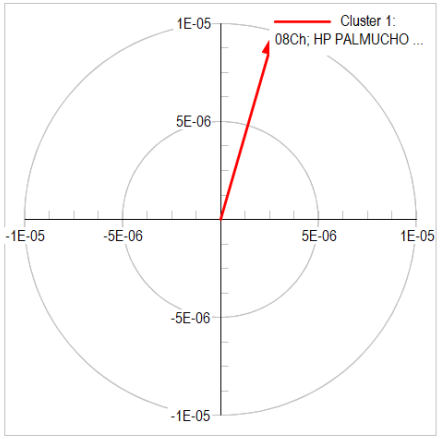
Eigenvalue of mode: -0.463 +4.819*j
Magnitude: 4.841 1/s, Angle: 95.491 deg
Period: 1.304 s, Frequency: 0.767 Hz
Damping: 0.463 1/s, Ratio of Amplitudes: 1.829

Mode 75: Observability



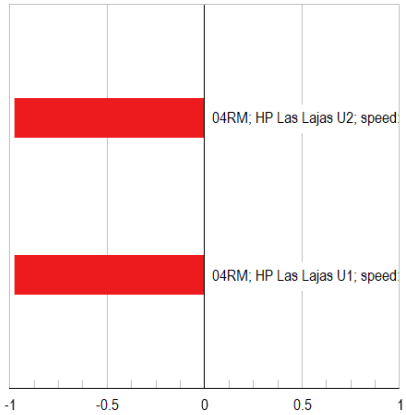
Eigenvalue of mode: -0.838 +8.703*j
Magnitude: 8.743 1/s, Angle: 95.501 deg
Period: 0.722 s, Frequency: 1.385 Hz
Damping: 0.838 1/s, Ratio of Amplitudes: 1.831

Mode 125: Observability



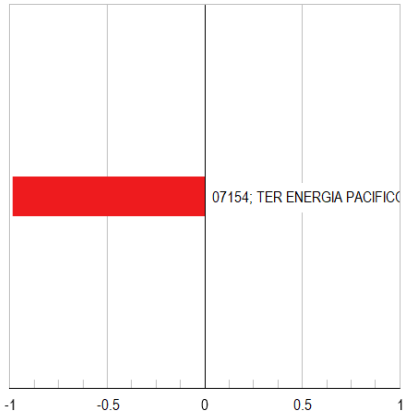
Eigenvalue of mode: -1.180 +11.954*j
Magnitude: 12.012 1/s, Angle: 95.638 deg
Period: 0.526 s, Frequency: 1.902 Hz
Damping: 1.180 1/s, Ratio of Amplitudes: 1.859

Mode 43: Participation



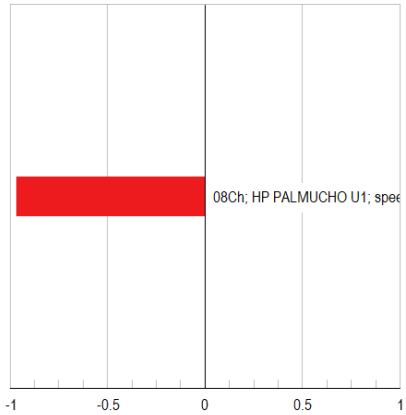
Eigenvalue of mode: -0.463 +4.819*j
Magnitude: 4.841 1/s, Angle: 95.491 deg
Period: 1.304 s, Frequency: 0.767 Hz
Damping: 0.463 1/s, Ratio of Amplitudes: 1.829
Min. contribution: 0.100

Mode 75: Participation



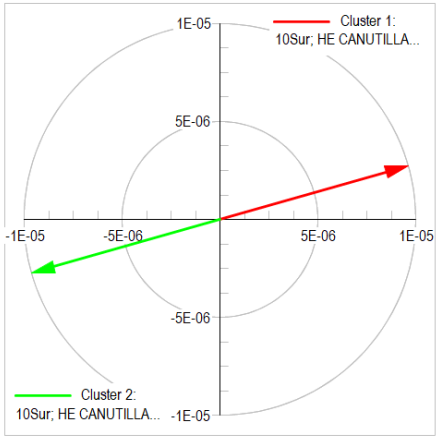
Eigenvalue of mode: -0.838 +8.703*j
Magnitude: 8.743 1/s, Angle: 95.501 deg
Period: 0.722 s, Frequency: 1.385 Hz
Damping: 0.838 1/s, Ratio of Amplitudes: 1.831
Min. contribution: 0.100

Mode 125: Participation



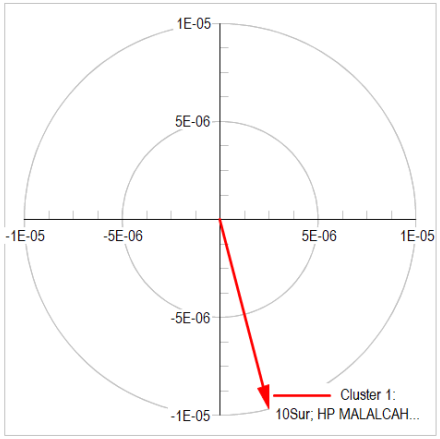
Eigenvalue of mode: -1.180 +11.954*j
Magnitude: 12.012 1/s, Angle: 95.638 deg
Period: 0.526 s, Frequency: 1.902 Hz
Damping: 1.180 1/s, Ratio of Amplitudes: 1.859
Min. contribution: 0.100

Mode 113: Observability



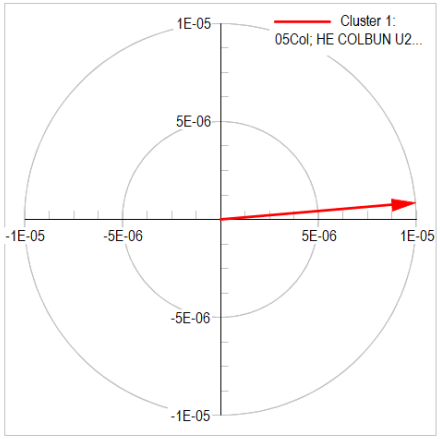
Eigenvalue of mode: -1.116 +11.300*j
Magnitude: 11.355 1/s, Angle: 95.642 deg
Period: 0.556 s, Frequency: 1.798 Hz
Damping: 1.116 1/s, Ratio of Amplitudes: 1.860

Mode 77: Observability



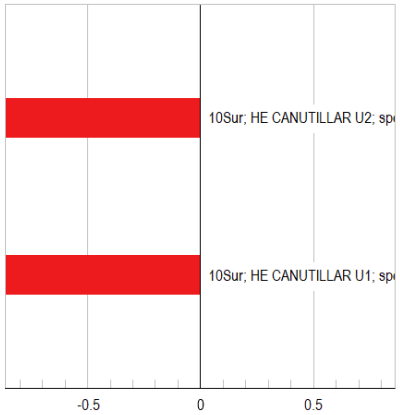
Eigenvalue of mode: -0.841 +8.500*j
Magnitude: 8.542 1/s, Angle: 95.652 deg
Period: 0.739 s, Frequency: 1.353 Hz
Damping: 0.841 1/s, Ratio of Amplitudes: 1.862

Mode 91: Observability



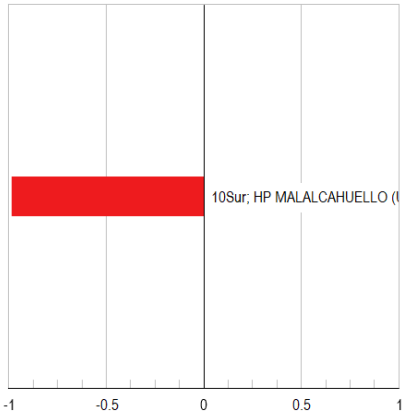
Eigenvalue of mode: -0.957 +9.663*j
Magnitude: 9.710 1/s, Angle: 95.658 deg
Period: 0.650 s, Frequency: 1.538 Hz
Damping: 0.957 1/s, Ratio of Amplitudes: 1.864

Mode 113: Participation



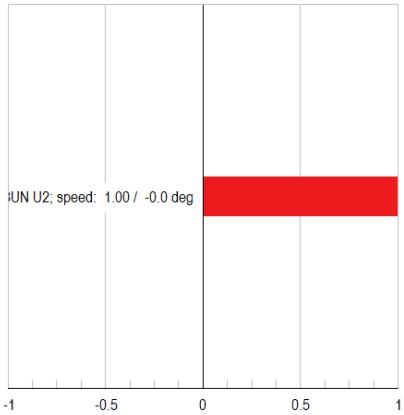
Eigenvalue of mode: -1.116 +11.300*j
Magnitude: 11.355 1/s, Angle: 95.642 deg
Period: 0.556 s, Frequency: 1.798 Hz
Damping: 1.116 1/s, Ratio of Amplitudes: 1.860
Min. contribution: 0.100

Mode 77: Participation



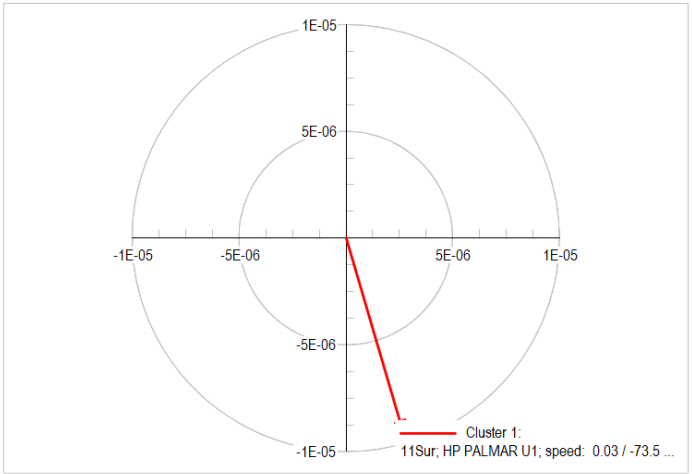
Eigenvalue of mode: -0.841 +8.500*j
Magnitude: 8.542 1/s, Angle: 95.652 deg
Period: 0.739 s, Frequency: 1.353 Hz
Damping: 0.841 1/s, Ratio of Amplitudes: 1.862
Min. contribution: 0.100

Mode 91: Participation



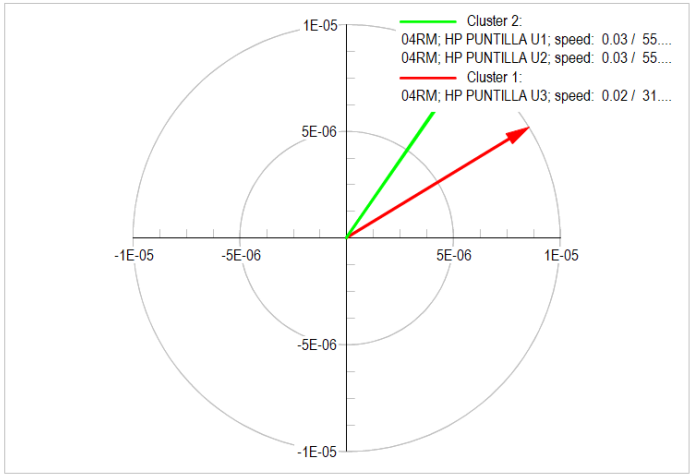
Eigenvalue of mode: -0.957 +9.663*j
Magnitude: 9.710 1/s, Angle: 95.658 deg
Period: 0.650 s, Frequency: 1.538 Hz
Damping: 0.957 1/s, Ratio of Amplitudes: 1.864
Min. contribution: 0.100

Mode 87: Observability



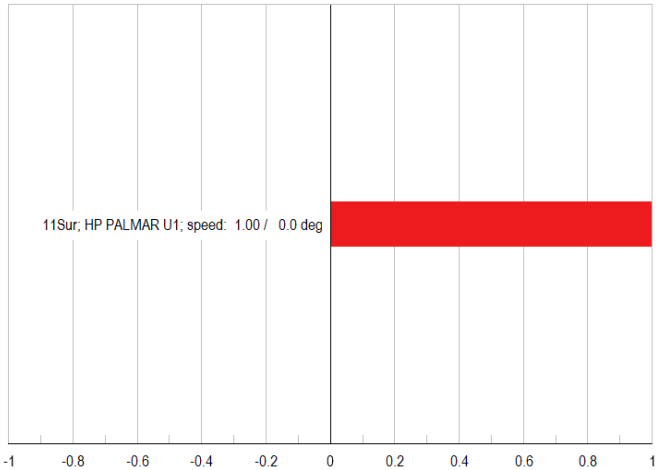
Eigenvalue of mode: -0.903 +9.024*j
Magnitude: 9.069 1/s, Angle: 95.713 deg
Period: 0.696 s, Frequency: 1.436 Hz
Damping: 0.903 1/s, Ratio of Amplitudes: 1.875

Mode 119: Observability



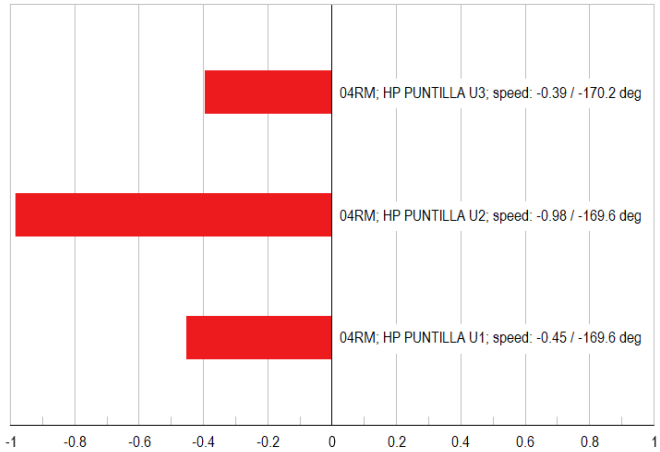
Eigenvalue of mode: -1.141 +11.355*j
Magnitude: 11.412 1/s, Angle: 95.737 deg
Period: 0.553 s, Frequency: 1.807 Hz
Damping: 1.141 1/s, Ratio of Amplitudes: 1.880

Mode 87: Participation

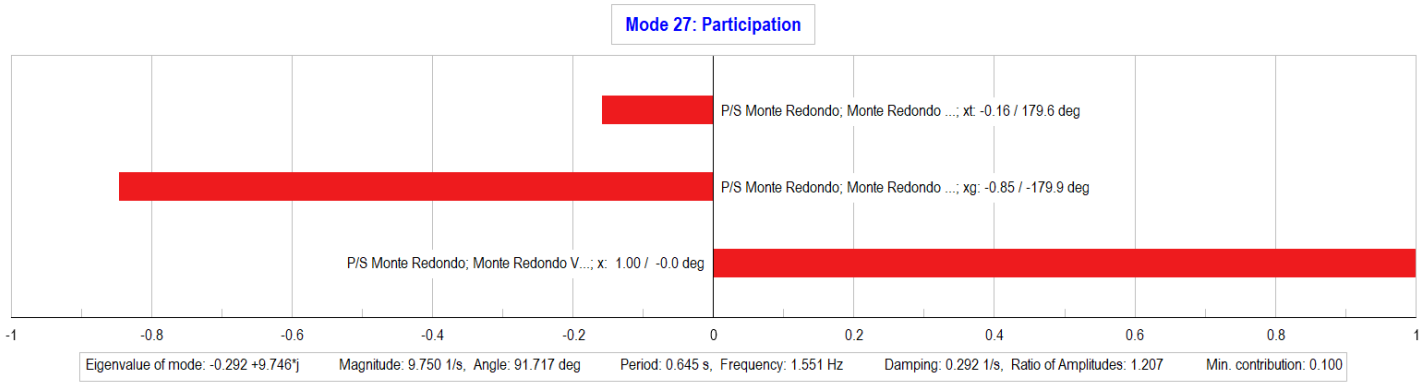


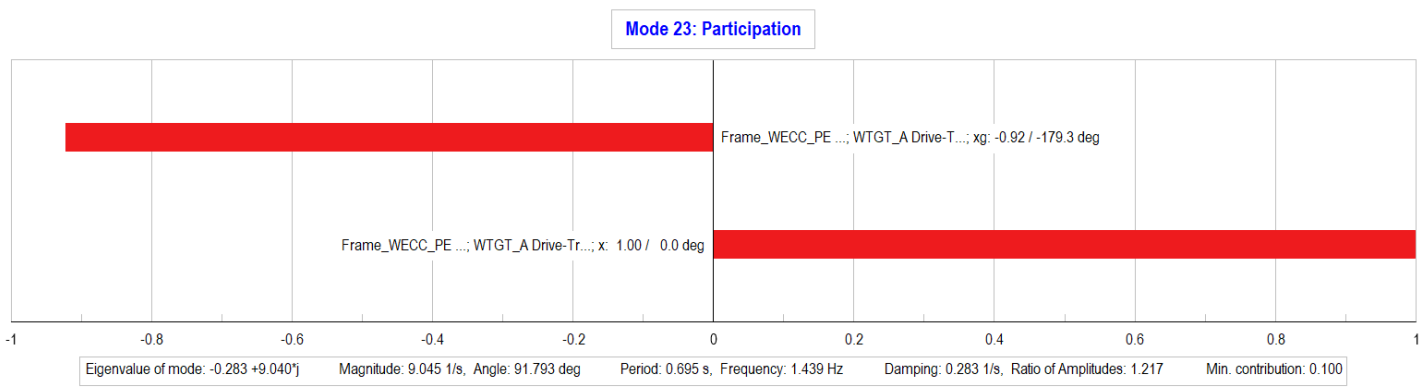
Eigenvalue of mode: -0.903 +9.024*j
Magnitude: 9.069 1/s, Angle: 95.713 deg
Period: 0.696 s, Frequency: 1.436 Hz
Damping: 0.903 1/s, Ratio of Amplitudes: 1.875
Min. contribution: 0.100

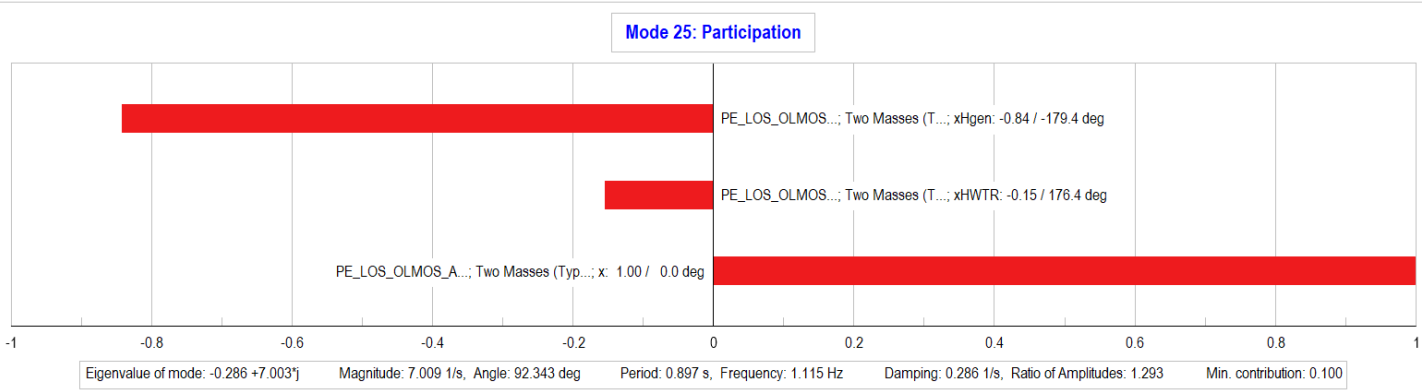
Mode 119: Participation

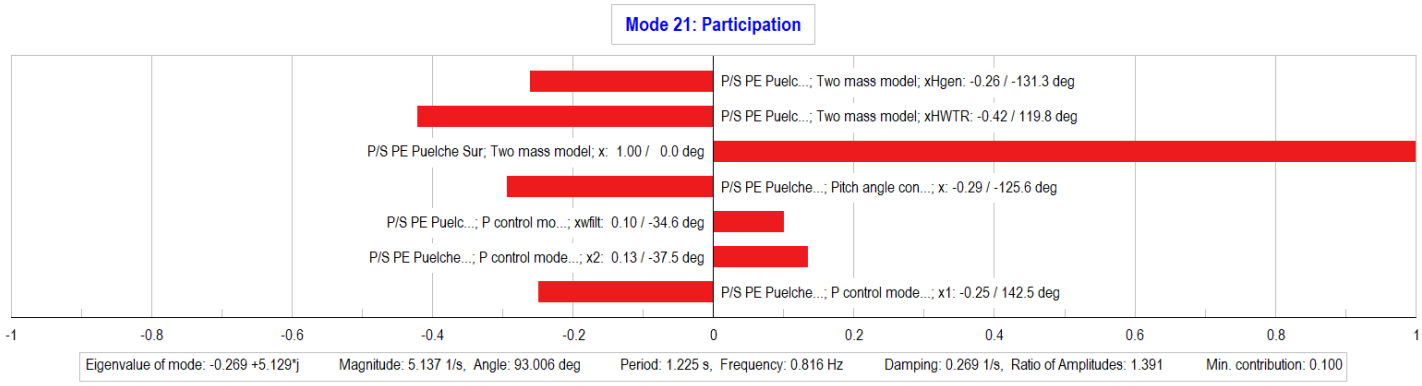


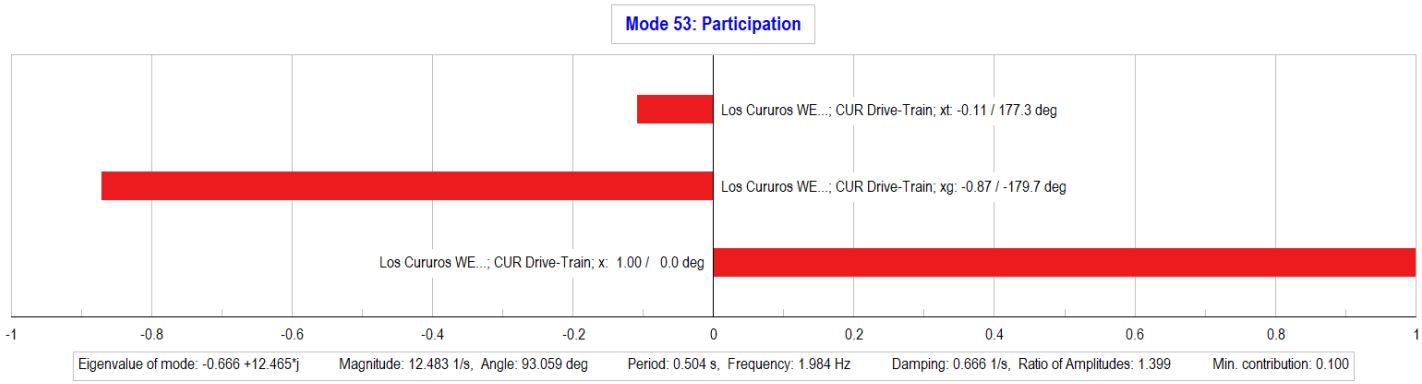
Eigenvalue of mode: -1.141 +11.355*j
Magnitude: 11.412 1/s, Angle: 95.737 deg
Period: 0.553 s, Frequency: 1.807 Hz
Damping: 1.141 1/s, Ratio of Amplitudes: 1.880
Min. contribution: 0.100

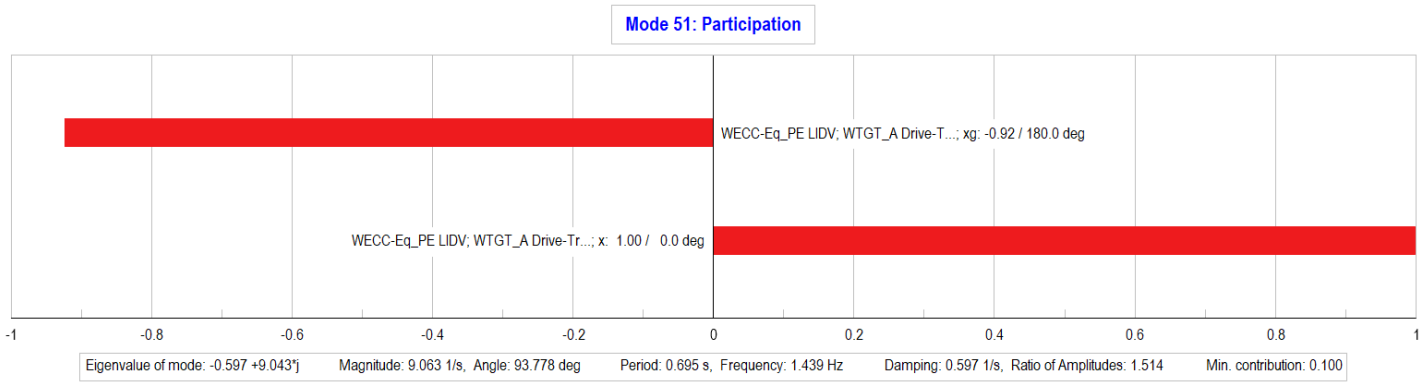

Mode 27: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.6 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.85 / -179.9 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.292 +9.746*j
Magnitude: 9.750 1/s, Angle: 91.717 deg
Period: 0.645 s, Frequency: 1.551 Hz
Damping: 0.292 1/s, Ratio of Amplitudes: 1.207
Min. contribution: 0.100

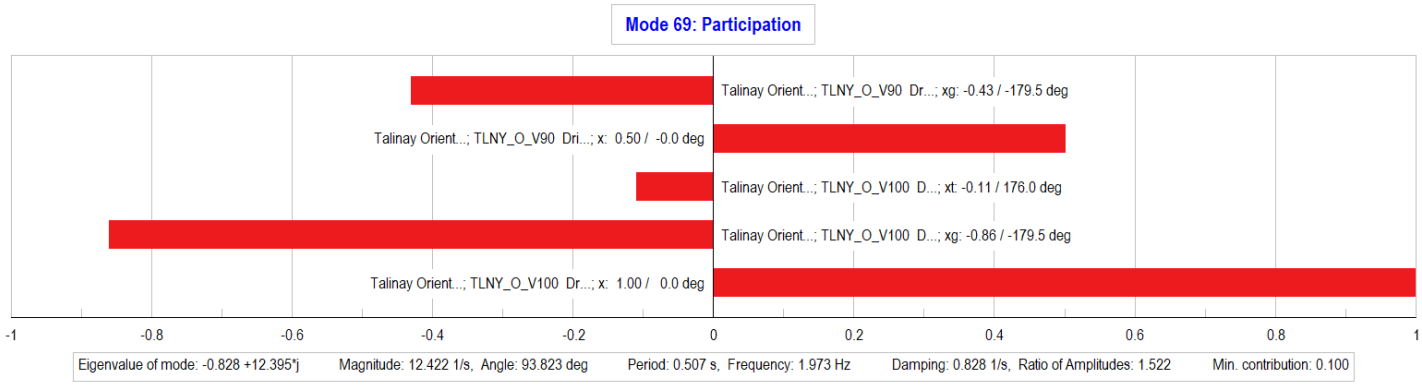

Mode 23: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.3 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.283 +9.040*j
Magnitude: 9.045 1/s, Angle: 91.793 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.283 1/s, Ratio of Amplitudes: 1.217
Min. contribution: 0.100

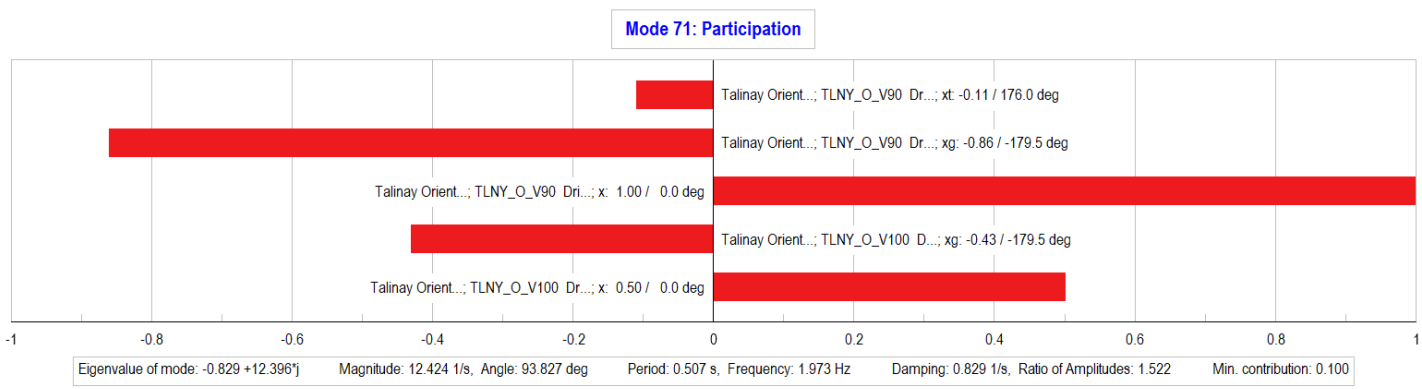

Mode 25: Participation
PE_LOS_OLMOS...; Two Masses (T...; xHgen: -0.84 / -179.4 deg
PE_LOS_OLMOS...; Two Masses (T...; xHWTR: -0.15 / 176.4 deg
PE_LOS_OLMOS_A...; Two Masses (Typ...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.286 +7.003*j
Magnitude: 7.009 1/s, Angle: 92.343 deg
Period: 0.897 s, Frequency: 1.115 Hz
Damping: 0.286 1/s, Ratio of Amplitudes: 1.293
Min. contribution: 0.100

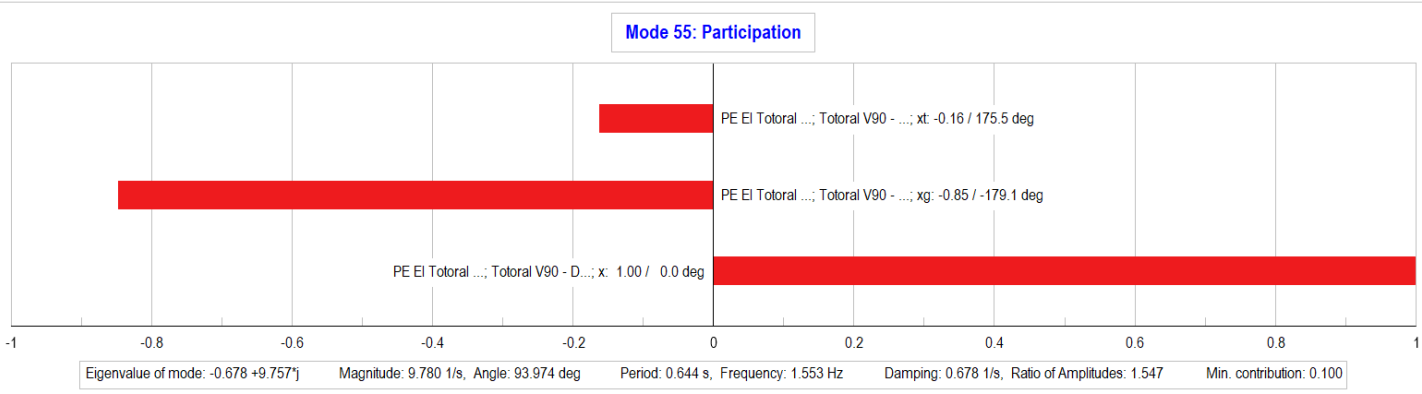

Mode 21: Participation
P/S PE Puelc...; Two mass model; xHgen: -0.26 / -131.3 deg
P/S PE Puelc...; Two mass model; xHWTR: -0.42 / 119.8 deg
P/S PE Puelche Sur; Two mass model; x: 1.00 / 0.0 deg
P/S PE Puelche...; Pitch angle con...; x: -0.29 / -125.6 deg
P/S PE Puelc...; P control mo...; xwfilt: 0.10 / -34.6 deg
P/S PE Puelche...; P control mode...; x2: 0.13 / -37.5 deg
P/S PE Puelche...; P control mode...; x1: -0.25 / 142.5 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.269 +5.129*j
Magnitude: 5.137 1/s, Angle: 93.006 deg
Period: 1.225 s, Frequency: 0.816 Hz
Damping: 0.269 1/s, Ratio of Amplitudes: 1.391
Min. contribution: 0.100

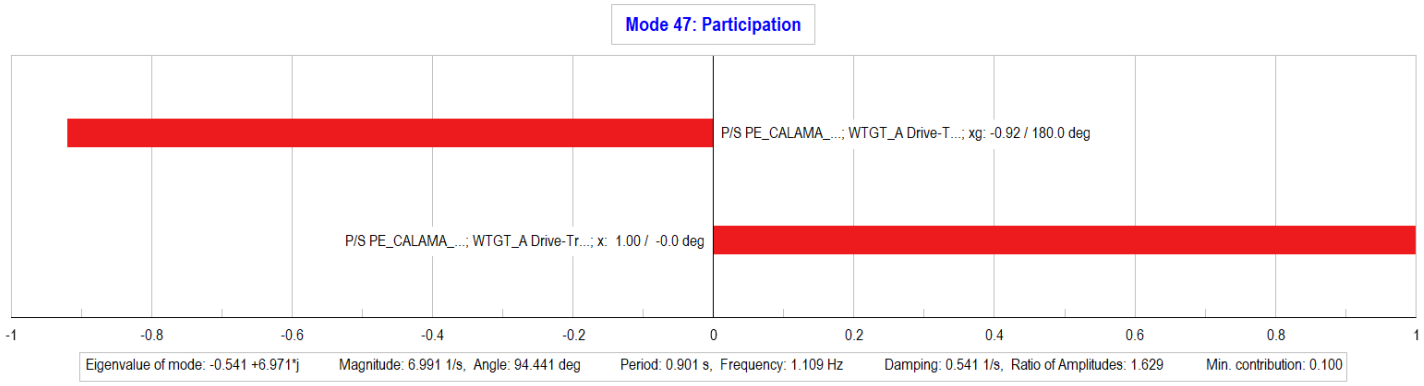

Mode 53: Participation
Los Cururos WE...; CUR Drive-Train; xt: -0.11 / 177.3 deg
Los Cururos WE...; CUR Drive-Train; xg: -0.87 / -179.7 deg
Los Cururos WE...; CUR Drive-Train; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.666 +12.465*j
Magnitude: 12.483 1/s, Angle: 93.059 deg
Period: 0.504 s, Frequency: 1.984 Hz
Damping: 0.666 1/s, Ratio of Amplitudes: 1.399
Min. contribution: 0.100

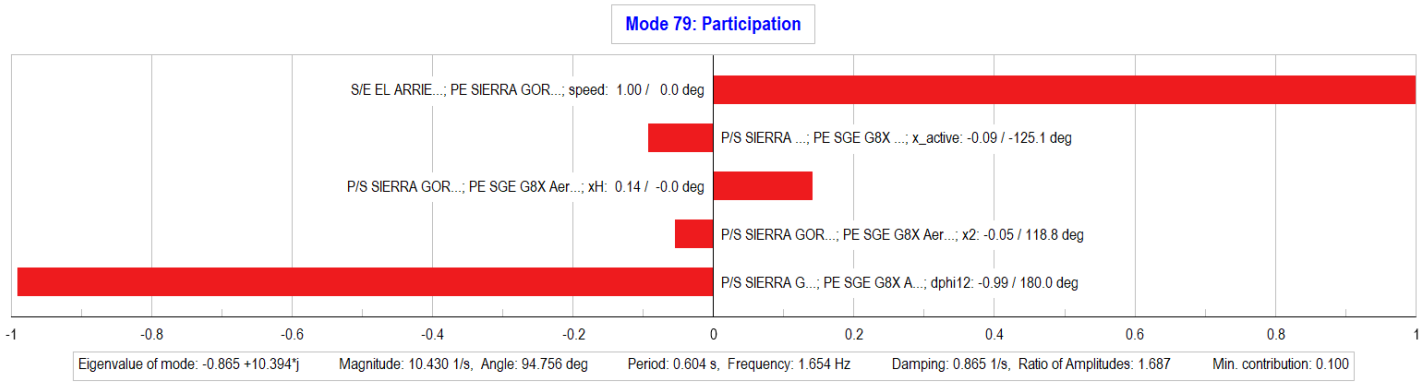

Mode 51: Participation
WECC-Eq_PE LIDV; WTGT_A Drive-T...; xg: -0.92 / 180.0 deg
WECC-Eq_PE LIDV; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.597 +9.043*j
Magnitude: 9.063 1/s, Angle: 93.778 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.597 1/s, Ratio of Amplitudes: 1.514
Min. contribution: 0.100

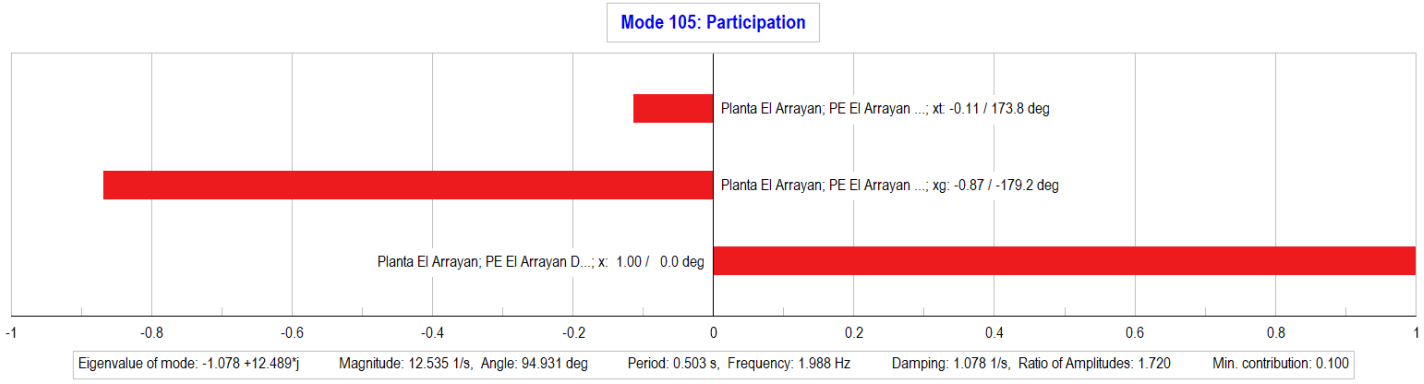

Mode 69: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.43 / -179.5 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 0.50 / -0.0 deg
Talinay Orient...; TLNY_O_V100 D...; xt: -0.11 / 176.0 deg
Talinay Orient...; TLNY_O_V100 D...; xg: -0.86 / -179.5 deg
Talinay Orient...; TLNY_O_V100 Dr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.828 +12.395*j
Magnitude: 12.422 1/s, Angle: 93.823 deg
Period: 0.507 s, Frequency: 1.973 Hz
Damping: 0.828 1/s, Ratio of Amplitudes: 1.522
Min. contribution: 0.100

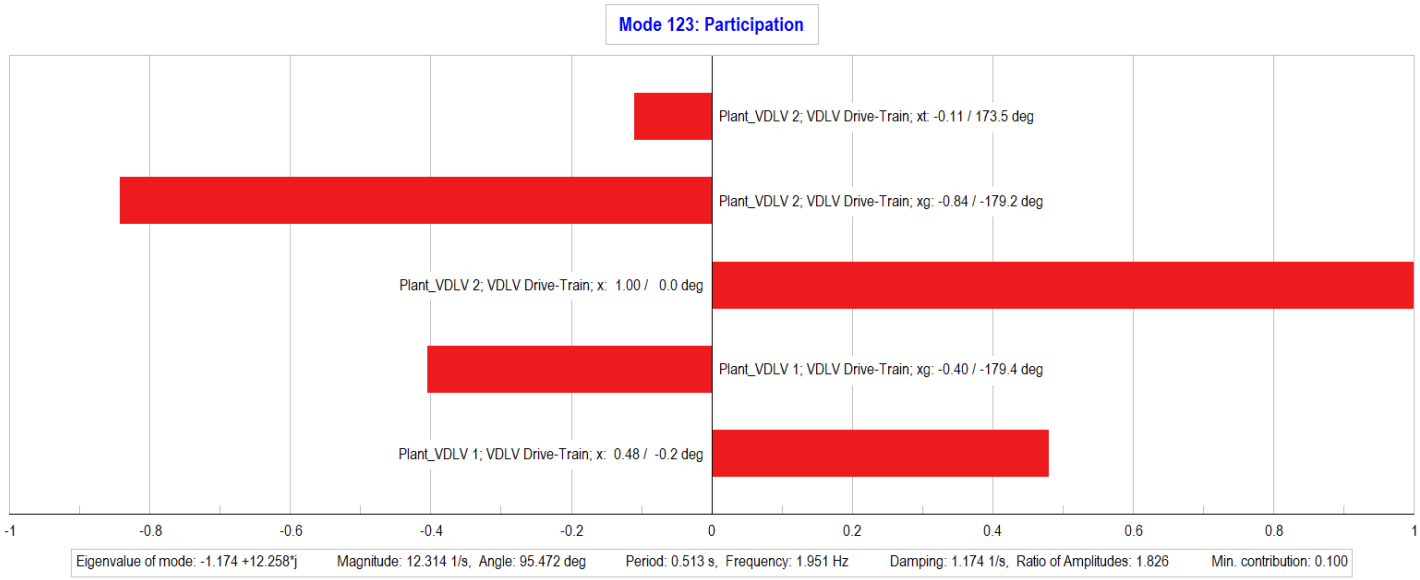

Mode 71: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 176.0 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.86 / -179.5 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / 0.0 deg
Talinay Orient...; TLNY_O_V100 D...; xg: -0.43 / -179.5 deg
Talinay Orient...; TLNY_O_V100 Dr...; x: 0.50 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.829 +12.396*j
Magnitude: 12.424 1/s, Angle: 93.827 deg
Period: 0.507 s, Frequency: 1.973 Hz
Damping: 0.829 1/s, Ratio of Amplitudes: 1.522
Min. contribution: 0.100

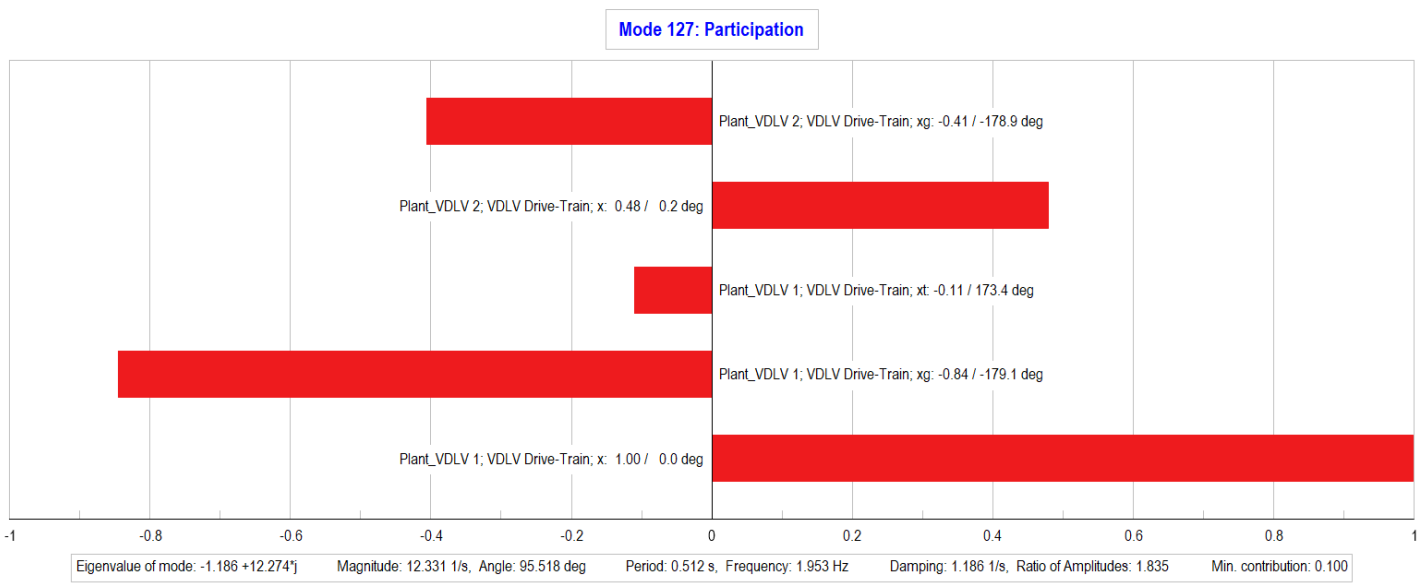

Mode 55: Participation
PE El Totoral ...; Totoral V90 - ...; xt: -0.16 / 175.5 deg
PE El Totoral ...; Totoral V90 - ...; xg: -0.85 / -179.1 deg
PE El Totoral ...; Totoral V90 - D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.678 +9.757*j
Magnitude: 9.780 1/s, Angle: 93.974 deg
Period: 0.644 s, Frequency: 1.553 Hz
Damping: 0.678 1/s, Ratio of Amplitudes: 1.547
Min. contribution: 0.100


Mode 47: Participation
P/S PE_CALAMA_...; WTGT_A Drive-T...; xg: -0.92 / 180.0 deg
P/S PE_CALAMA_...; WTGT_A Drive-Tr...; x: 1.00 / -0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.541 +6.971*j
Magnitude: 6.991 1/s, Angle: 94.441 deg
Period: 0.901 s, Frequency: 1.109 Hz
Damping: 0.541 1/s, Ratio of Amplitudes: 1.629
Min. contribution: 0.100

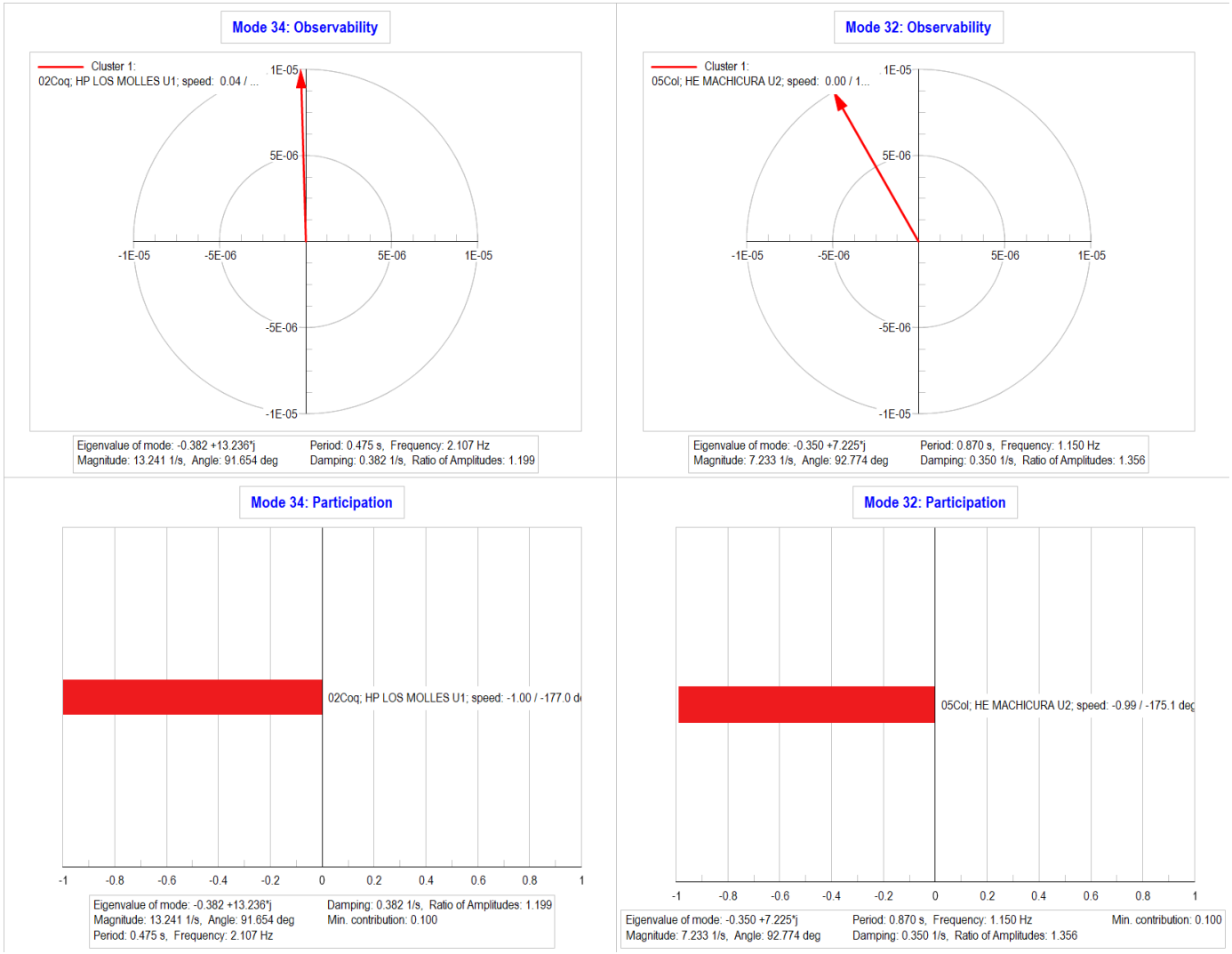

Mode 79: Participation
S/E EL ARRIE...; PE SIERRA GOR...; speed: 1.00 / 0.0 deg
P/S SIERRA ...; PE SGE G8X ...; x_active: -0.09 / -125.1 deg
P/S SIERRA GOR...; PE SGE G8X Aer...; xH: 0.14 / -0.0 deg
P/S SIERRA GOR...; PE SGE G8X Aer...; x2: -0.05 / 118.8 deg
P/S SIERRA G...; PE SGE G8X A...; dphi12: -0.99 / 180.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -0.865 +10.394*j
Magnitude: 10.430 1/s, Angle: 94.756 deg
Period: 0.604 s, Frequency: 1.654 Hz
Damping: 0.865 1/s, Ratio of Amplitudes: 1.687
Min. contribution: 0.100


Mode 105: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 173.8 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.87 / -179.2 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Eigenvalue of mode: -1.078 +12.489*j
Magnitude: 12.535 1/s, Angle: 94.931 deg
Period: 0.503 s, Frequency: 1.988 Hz
Damping: 1.078 1/s, Ratio of Amplitudes: 1.720
Min. contribution: 0.100

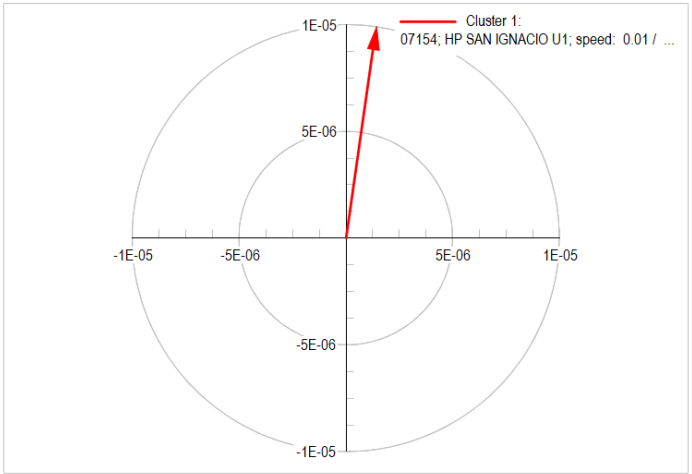

Mode 123: Participation
Plant_VDLV 2; VDLV Drive-Train; xt: -0.11 / 173.5 deg
Plant_VDLV 2; VDLV Drive-Train; xg: -0.84 / -179.2 deg
Plant_VDLV 2; VDLV Drive-Train; x: 1.00 / 0.0 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.40 / -179.4 deg
Plant_VDLV 1; VDLV Drive-Train; x: 0.48 / -0.2 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -1.174 +12.258*j
Magnitude: 12.314 1/s, Angle: 95.472 deg
Period: 0.513 s, Frequency: 1.951 Hz
Damping: 1.174 1/s, Ratio of Amplitudes: 1.826
Min. contribution: 0.100


Mode 127: Participation
Plant_VDLV 2; VDLV Drive-Train; xg: -0.41 / -178.9 deg
Plant_VDLV 2; VDLV Drive-Train; x: 0.48 / 0.2 deg
Plant_VDLV 1; VDLV Drive-Train; xt: -0.11 / 173.4 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.84 / -179.1 deg
Plant_VDLV 1; VDLV Drive-Train; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -1.186 +12.274*j
Magnitude: 12.331 1/s, Angle: 95.518 deg
Period: 0.512 s, Frequency: 1.953 Hz
Damping: 1.186 1/s, Ratio of Amplitudes: 1.835
Min. contribution: 0.100

15.3.2 Red N-1 Caso 1.- Changos – Parinas 500 kV

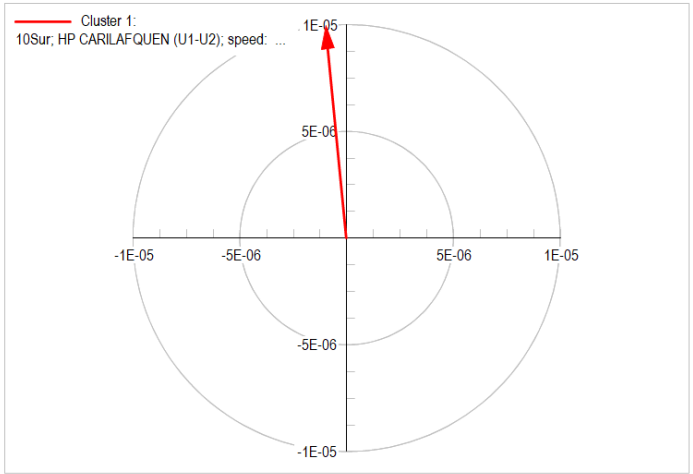


Mode 42: Observability



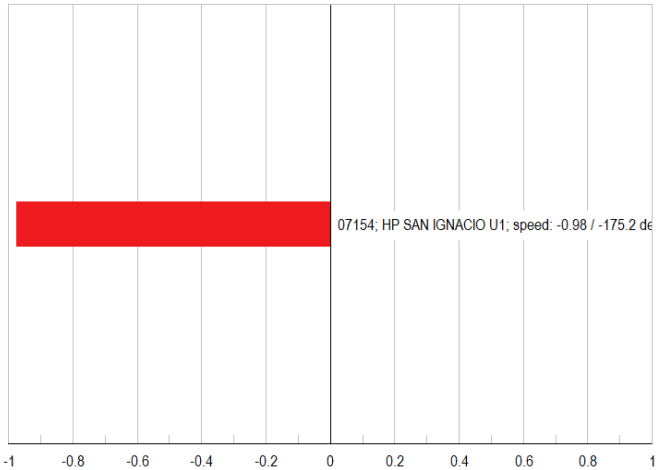
Eigenvalue of mode: -0.443 +9.036*j Period: 0.695 s, Frequency: 1.438 Hz
Magnitude: 9.047 1/s, Angle: 92.809 deg Damping: 0.443 1/s, Ratio of Amplitudes: 1.361

Mode 20: Observability



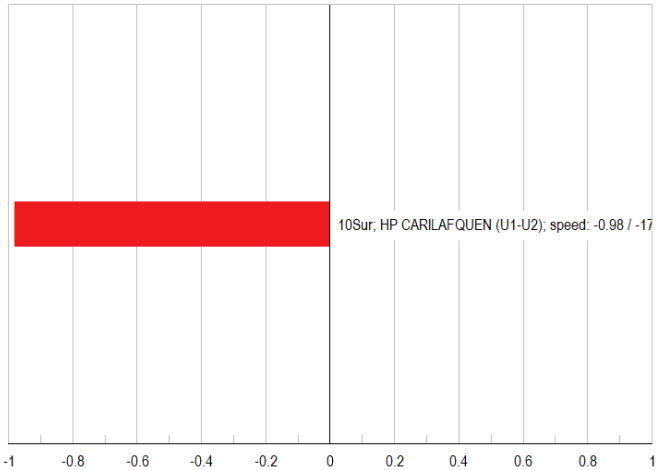
Eigenvalue of mode: -0.266 +5.361*j Period: 1.172 s, Frequency: 0.853 Hz
Magnitude: 5.368 1/s, Angle: 92.835 deg Damping: 0.266 1/s, Ratio of Amplitudes: 1.365

Mode 42: Participation

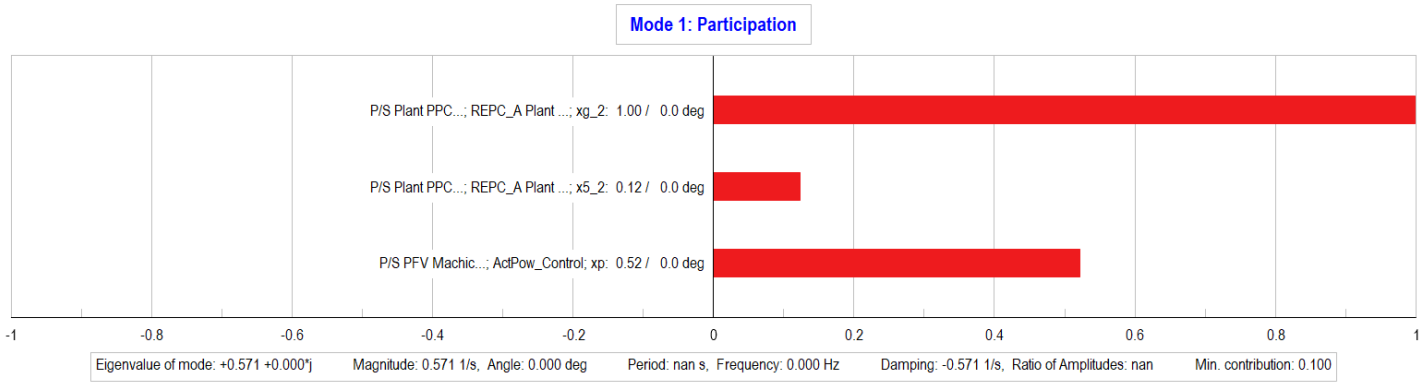


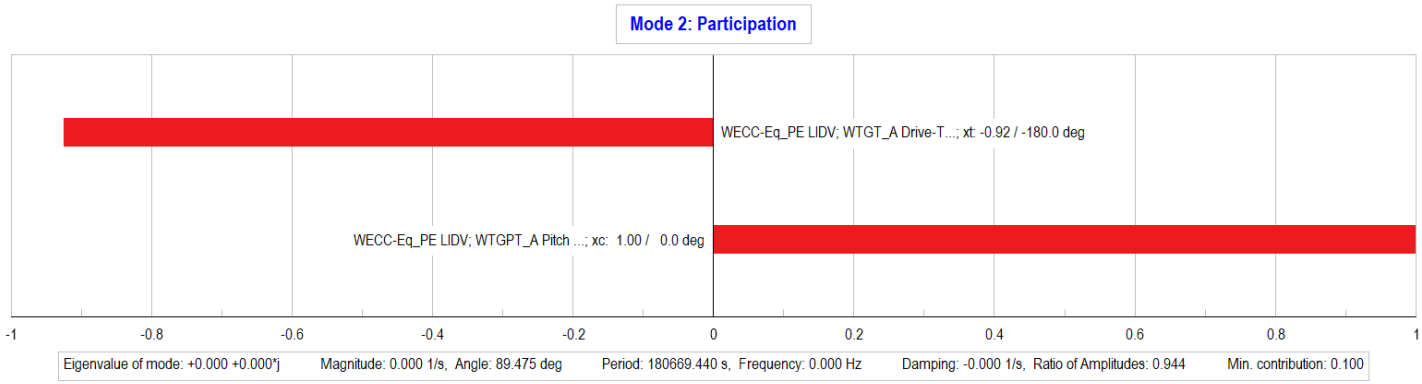
Eigenvalue of mode: -0.443 +9.036*j Period: 0.695 s, Frequency: 1.438 Hz Min. contribution: 0.100
Magnitude: 9.047 1/s, Angle: 92.809 deg Damping: 0.443 1/s, Ratio of Amplitudes: 1.361

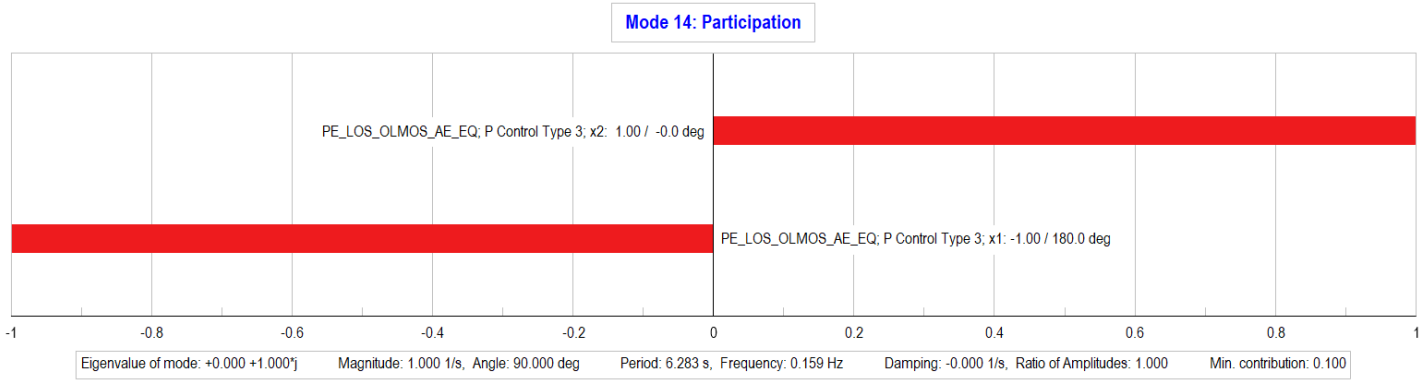
Mode 20: Participation

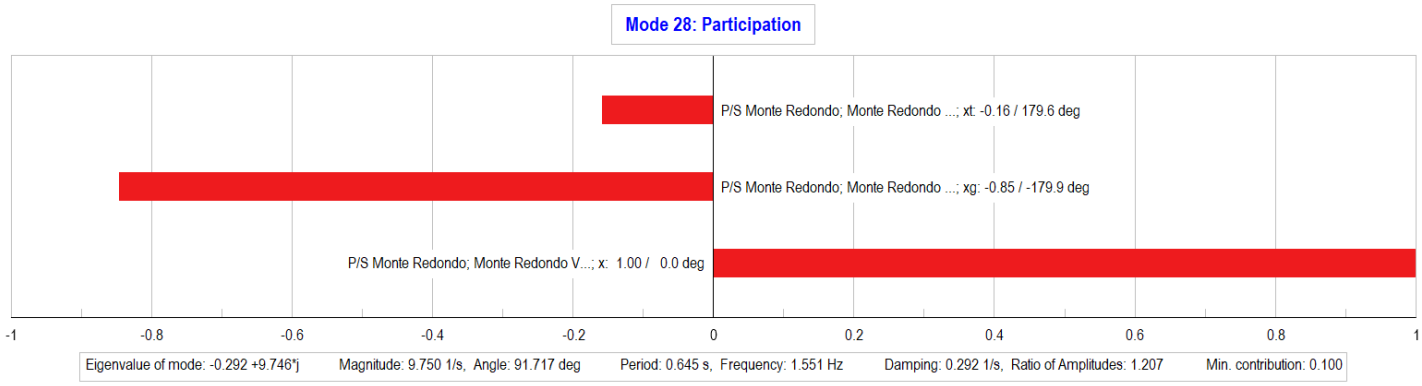


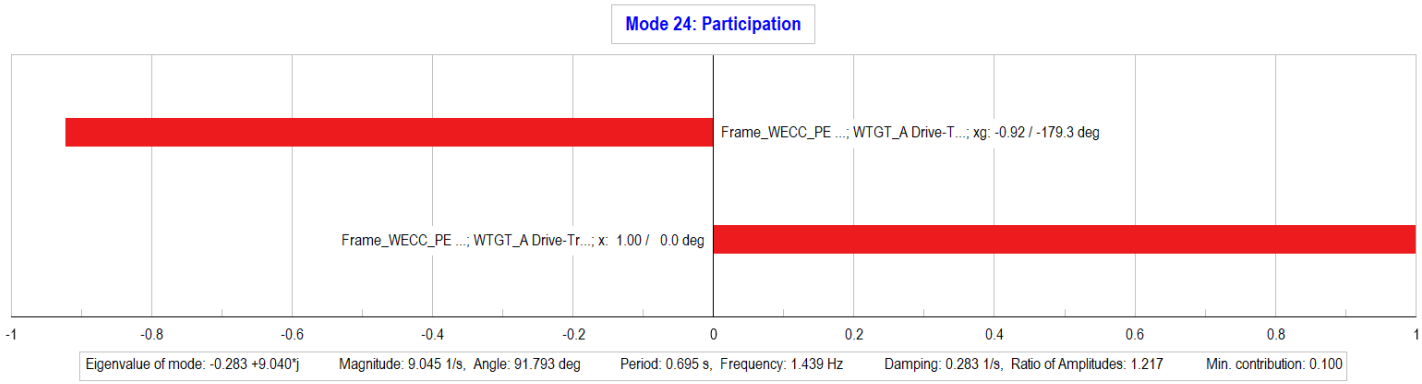
Eigenvalue of mode: -0.266 +5.361*j Period: 1.172 s, Frequency: 0.853 Hz Min. contribution: 0.100
Magnitude: 5.368 1/s, Angle: 92.835 deg Damping: 0.266 1/s, Ratio of Amplitudes: 1.365

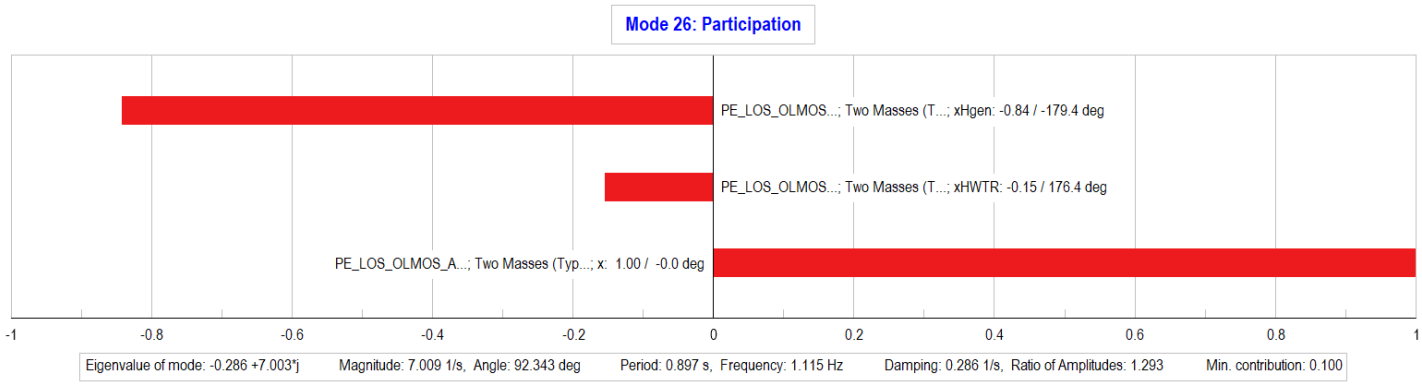

Mode 1: Participation
P/S Plant PPC...; REPC_A Plant ...; xg_2: 1.00 / 0.0 deg
P/S Plant PPC...; REPC_A Plant ...; x5_2: 0.12 / 0.0 deg
P/S PFV Machic...; ActPow_Control; xp: 0.52 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.571 +0.000*j
Magnitude: 0.571 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.571 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100


Mode 2: Participation
WECC-Eq_PE LIDV; WTGT_A Drive-T...; xt: -0.92 / -180.0 deg
WECC-Eq_PE LIDV; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 89.475 deg
Period: 180669.440 s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 0.944
Min. contribution: 0.100

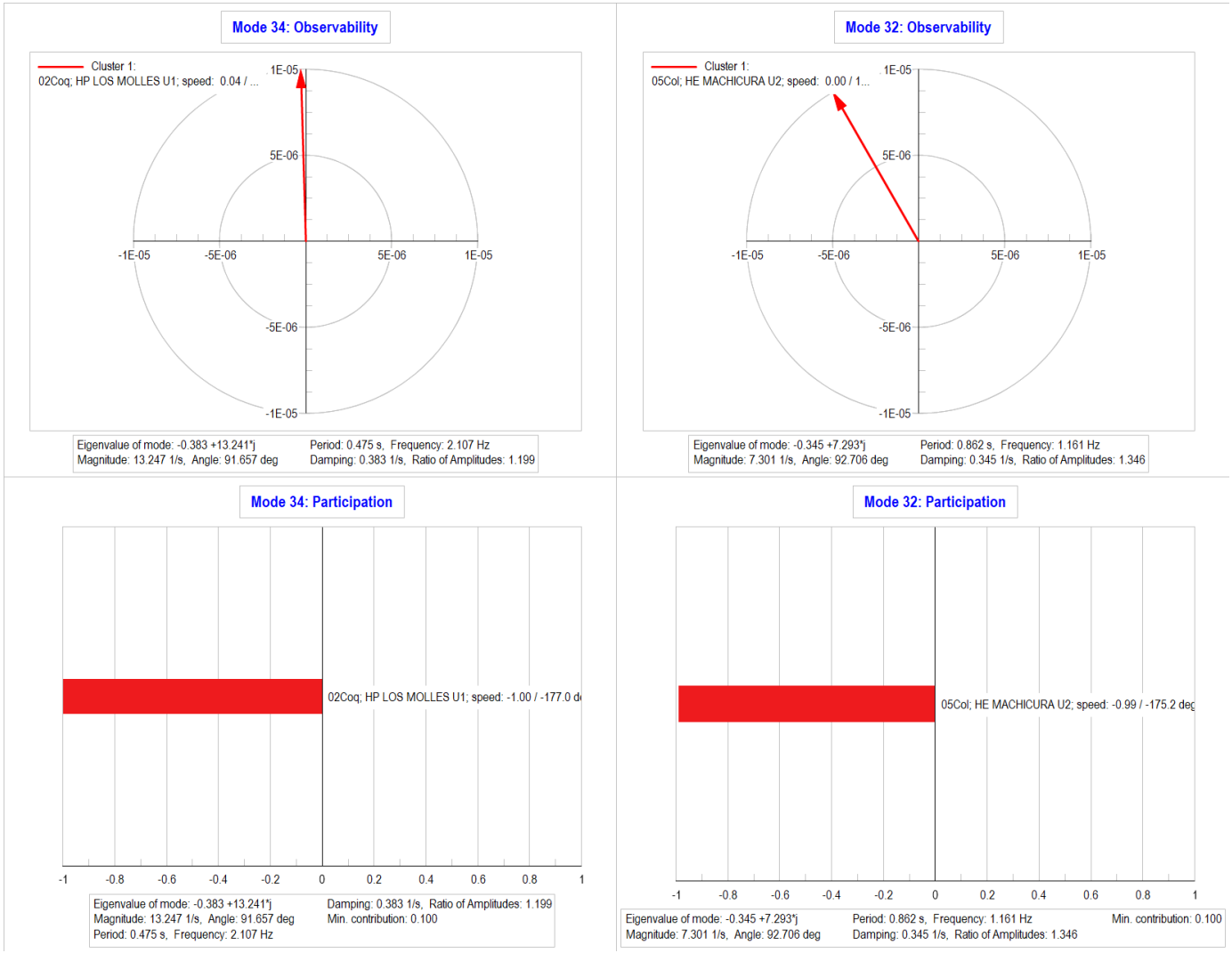

Mode 14: Participation
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x2: 1.00 / -0.0 deg
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x1: -1.00 / 180.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +1.000*j
Magnitude: 1.000 1/s, Angle: 90.000 deg
Period: 6.283 s, Frequency: 0.159 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 1.000
Min. contribution: 0.100


Mode 28: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.6 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.85 / -179.9 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.292 +9.746*j
Magnitude: 9.750 1/s, Angle: 91.717 deg
Period: 0.645 s, Frequency: 1.551 Hz
Damping: 0.292 1/s, Ratio of Amplitudes: 1.207
Min. contribution: 0.100

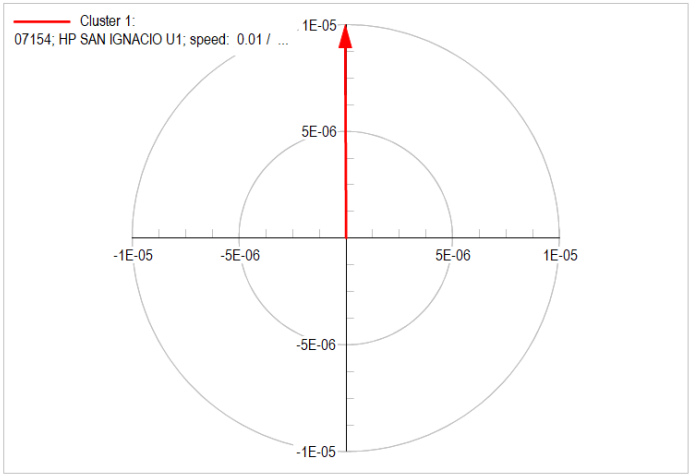

Mode 24: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.3 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.283 +9.040*j
Magnitude: 9.045 1/s, Angle: 91.793 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.283 1/s, Ratio of Amplitudes: 1.217
Min. contribution: 0.100


Mode 26: Participation
PE_LOS_OLMOS...; Two Masses (T...; xHgen: -0.84 / -179.4 deg
PE_LOS_OLMOS...; Two Masses (T...; xHWTR: -0.15 / 176.4 deg
PE_LOS_OLMOS_A...; Two Masses (Typ...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.286 +7.003*j
Magnitude: 7.009 1/s, Angle: 92.343 deg
Period: 0.897 s, Frequency: 1.115 Hz
Damping: 0.286 1/s, Ratio of Amplitudes: 1.293
Min. contribution: 0.100

15.3.3 Red N-1 Caso 2.- Nueva Pan de Azúcar - Polpaico 500 kV

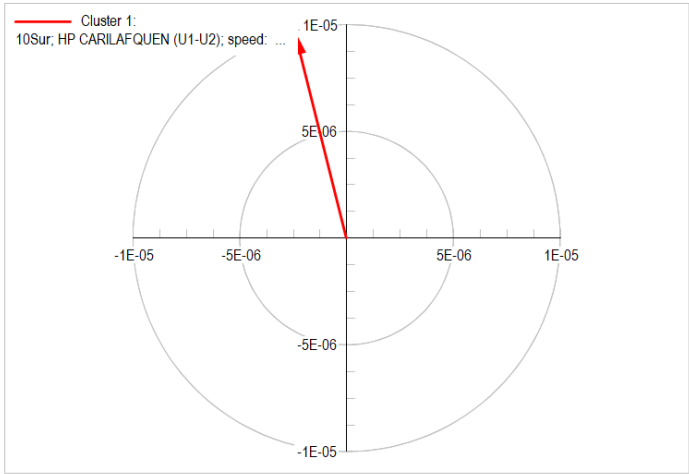


Mode 40: Observability



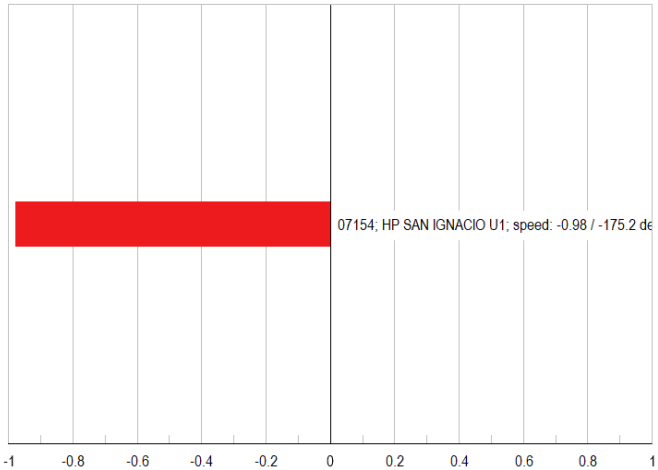
Eigenvalue of mode: -0.439 +9.044*j
Magnitude: 9.055 1/s, Angle: 92.777 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.439 1/s, Ratio of Amplitudes: 1.356

Mode 20: Observability



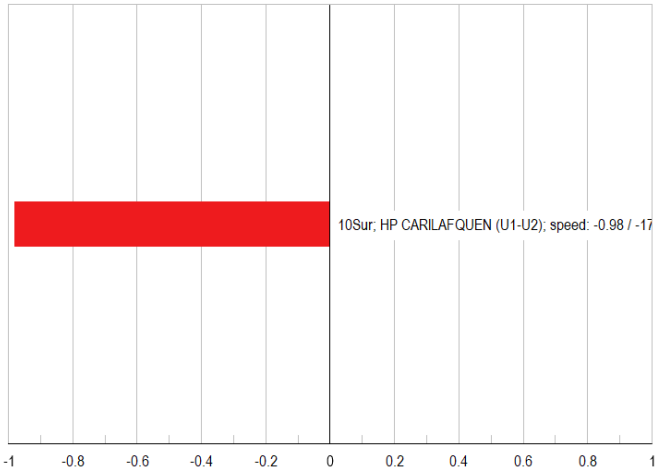
Eigenvalue of mode: -0.266 +5.362*j
Magnitude: 5.368 1/s, Angle: 92.843 deg
Period: 1.172 s, Frequency: 0.853 Hz
Damping: 0.266 1/s, Ratio of Amplitudes: 1.366

Mode 40: Participation

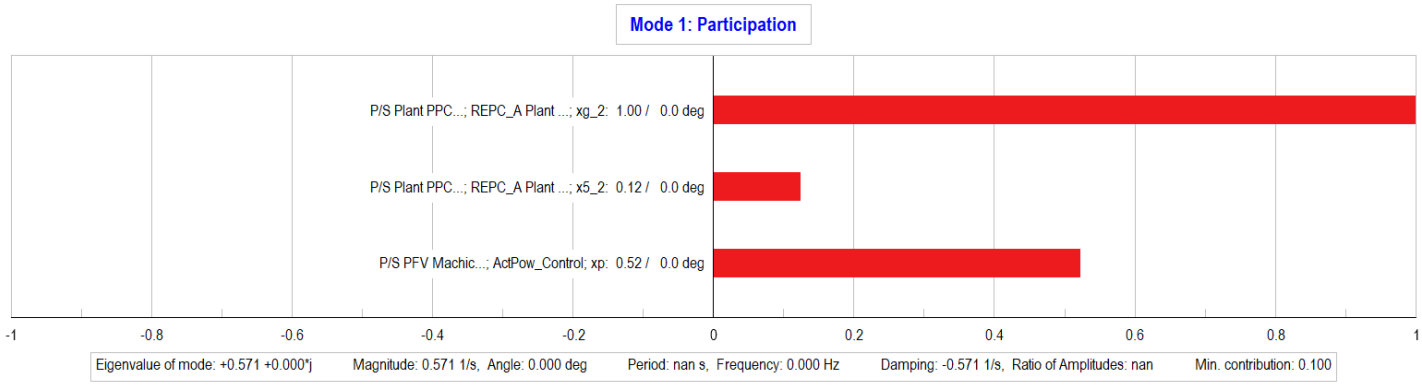


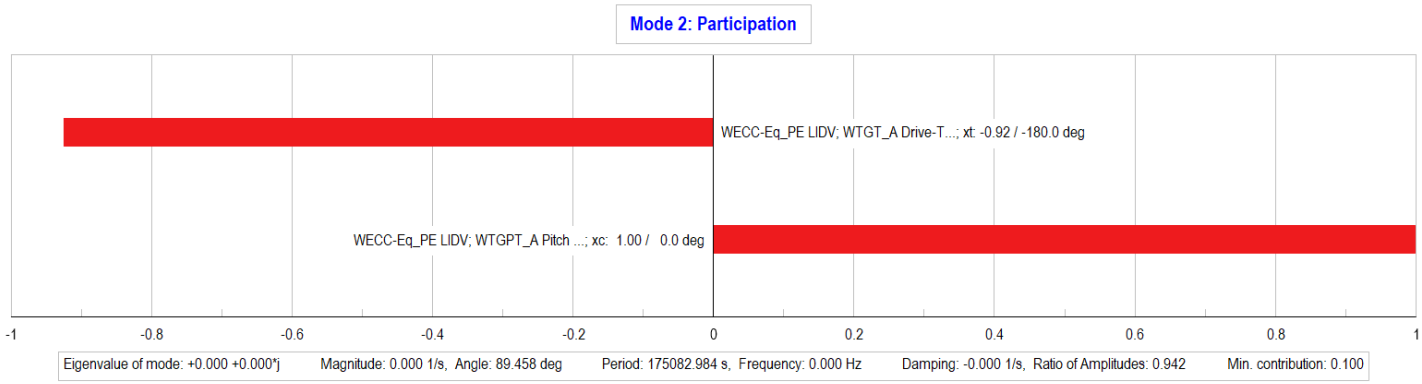
Eigenvalue of mode: -0.439 +9.044*j
Magnitude: 9.055 1/s, Angle: 92.777 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.439 1/s, Ratio of Amplitudes: 1.356
Min. contribution: 0.100

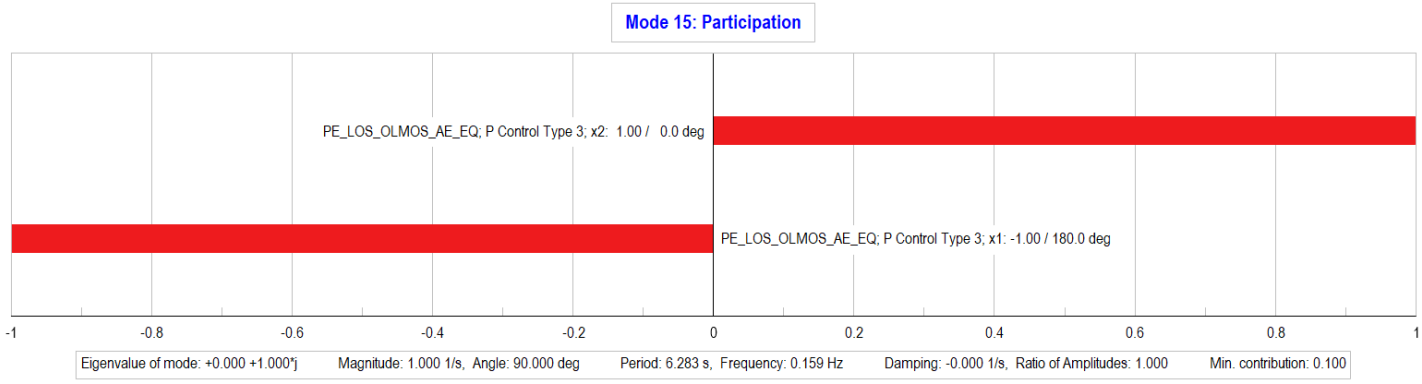
Mode 20: Participation

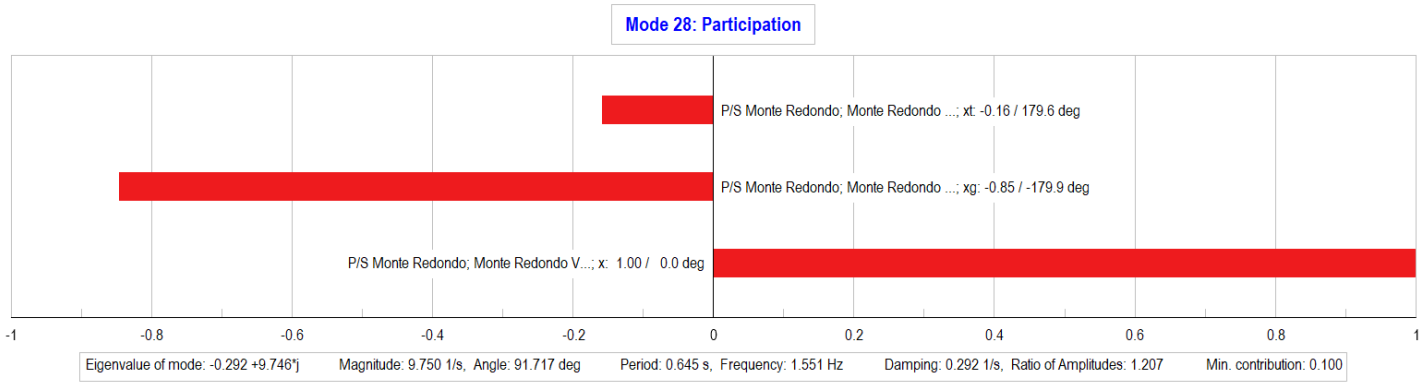


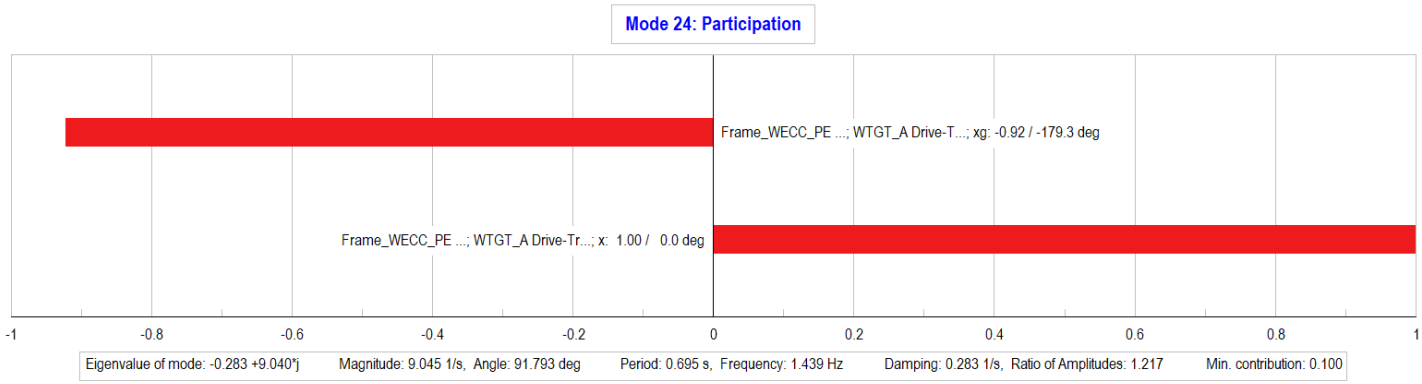
Eigenvalue of mode: -0.266 +5.362*j
Magnitude: 5.368 1/s, Angle: 92.843 deg
Period: 1.172 s, Frequency: 0.853 Hz
Damping: 0.266 1/s, Ratio of Amplitudes: 1.366
Min. contribution: 0.100

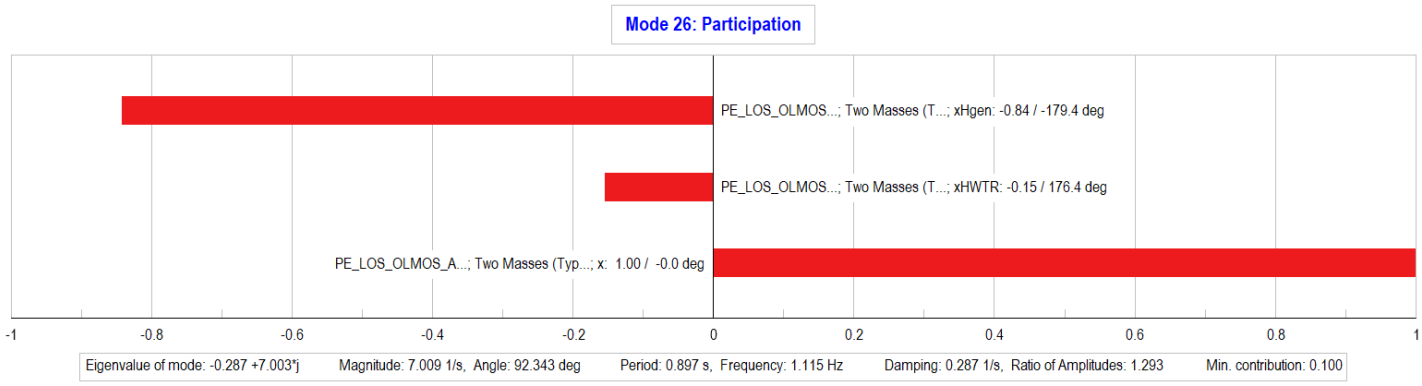

Mode 1: Participation
P/S Plant PPC...; REPC_A Plant ...; xg_2: 1.00 / 0.0 deg
P/S Plant PPC...; REPC_A Plant ...; x5_2: 0.12 / 0.0 deg
P/S PFV Machic...; ActPow_Control; xp: 0.52 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.571 +0.000*j
Magnitude: 0.571 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.571 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100


Mode 2: Participation
WECC-Eq_PE LIDV; WTGT_A Drive-T...; xt: -0.92 / -180.0 deg
WECC-Eq_PE LIDV; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 89.458 deg
Period: 175082.984 s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 0.942
Min. contribution: 0.100

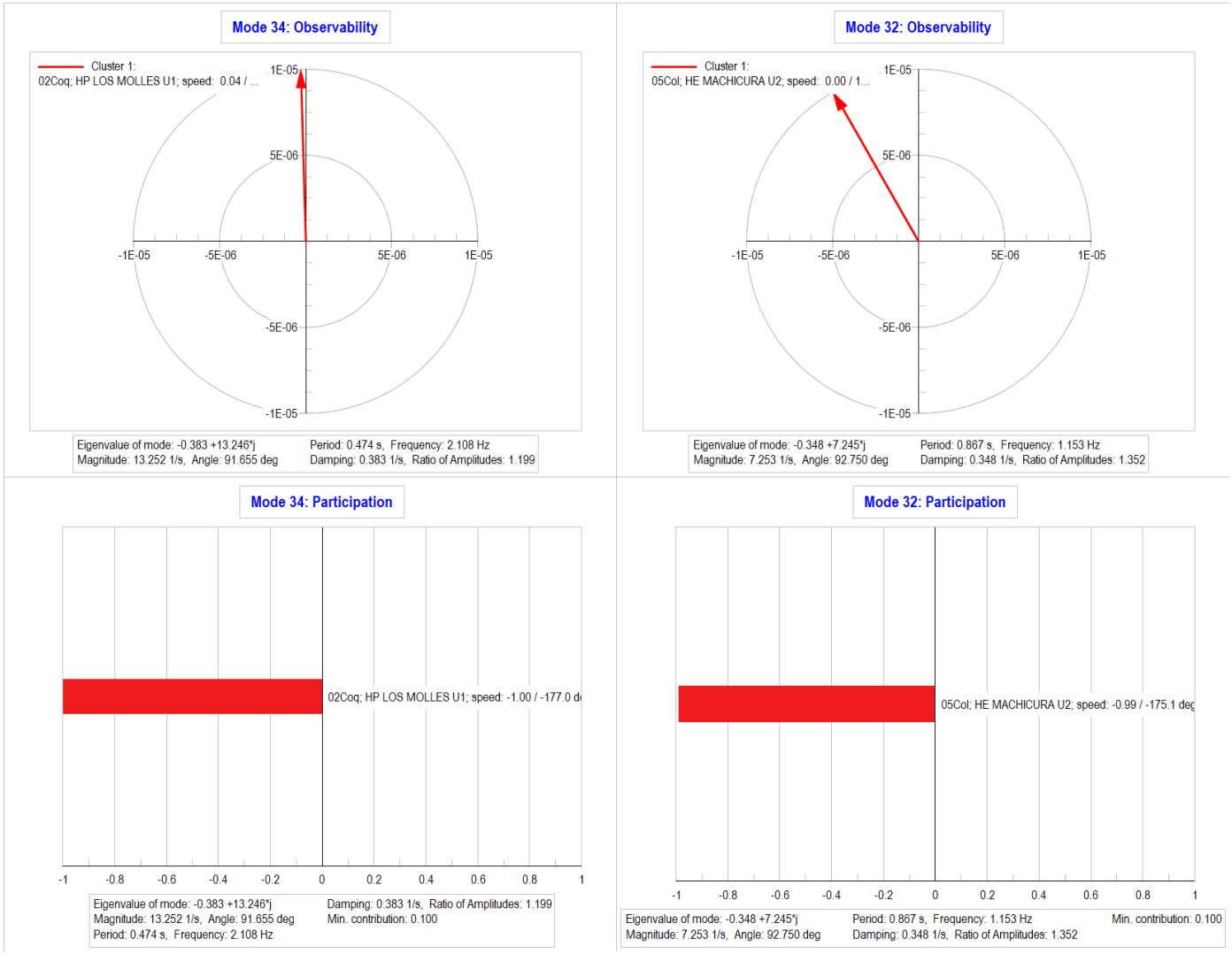

Mode 15: Participation
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x2: 1.00 / 0.0 deg
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x1: -1.00 / 180.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +1.000*j
Magnitude: 1.000 1/s, Angle: 90.000 deg
Period: 6.283 s, Frequency: 0.159 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 1.000
Min. contribution: 0.100


Mode 28: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.6 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.85 / -179.9 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.292 +9.746*j
Magnitude: 9.750 1/s, Angle: 91.717 deg
Period: 0.645 s, Frequency: 1.551 Hz
Damping: 0.292 1/s, Ratio of Amplitudes: 1.207
Min. contribution: 0.100

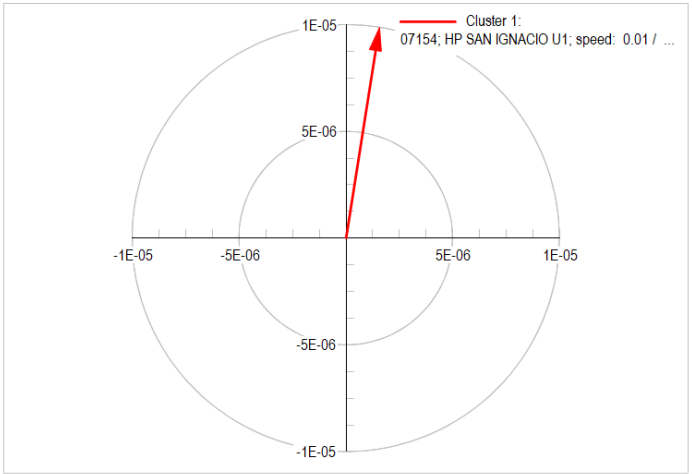

Mode 24: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.3 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.283 +9.040*j
Magnitude: 9.045 1/s, Angle: 91.793 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.283 1/s, Ratio of Amplitudes: 1.217
Min. contribution: 0.100


Mode 26: Participation
PE_LOS_OLMOS...; Two Masses (T...; xHgen: -0.84 / -179.4 deg
PE_LOS_OLMOS...; Two Masses (T...; xHWTR: -0.15 / 176.4 deg
PE_LOS_OLMOS_A...; Two Masses (Typ...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.287 +7.003*j
Magnitude: 7.009 1/s, Angle: 92.343 deg
Period: 0.897 s, Frequency: 1.115 Hz
Damping: 0.287 1/s, Ratio of Amplitudes: 1.293
Min. contribution: 0.100

15.3.4 Red N-1 Caso 3.- Charrúa - Ancoa 500 kV

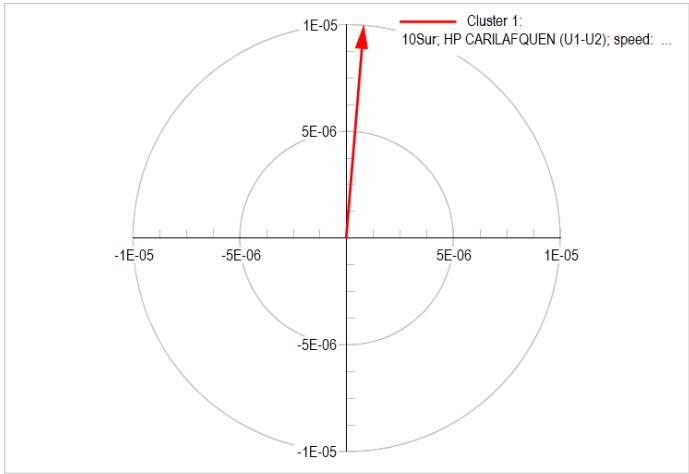


Mode 42: Observability



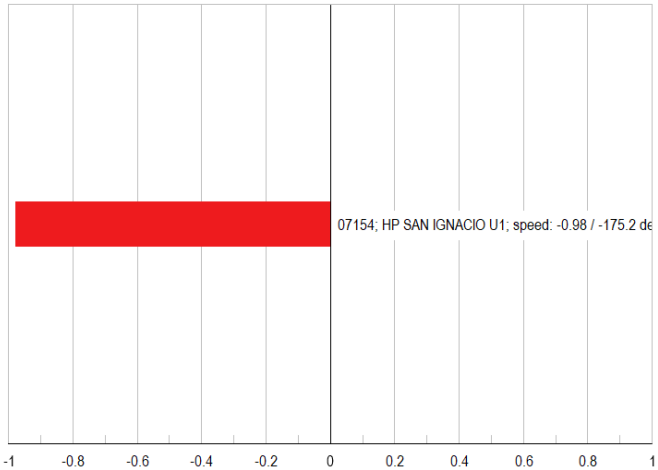
Eigenvalue of mode: -0.442 +9.038*j Period: 0.695 s, Frequency: 1.438 Hz
Magnitude: 9.049 1/s, Angle: 92.801 deg Damping: 0.442 1/s, Ratio of Amplitudes: 1.360

Mode 20: Observability



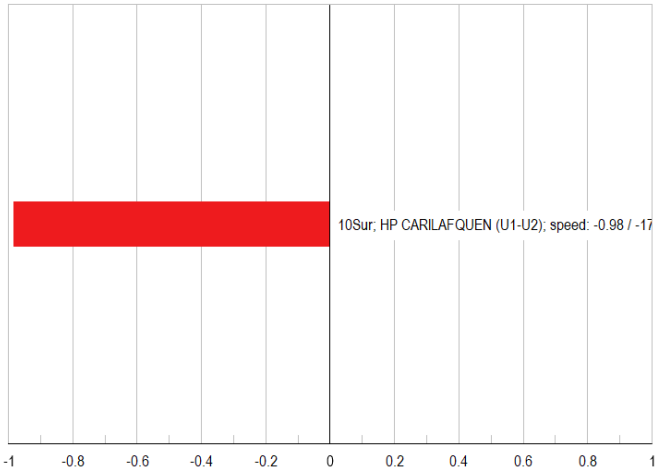
Eigenvalue of mode: -0.264 +5.359*j Period: 1.172 s, Frequency: 0.853 Hz
Magnitude: 5.366 1/s, Angle: 92.824 deg Damping: 0.264 1/s, Ratio of Amplitudes: 1.363

Mode 42: Participation

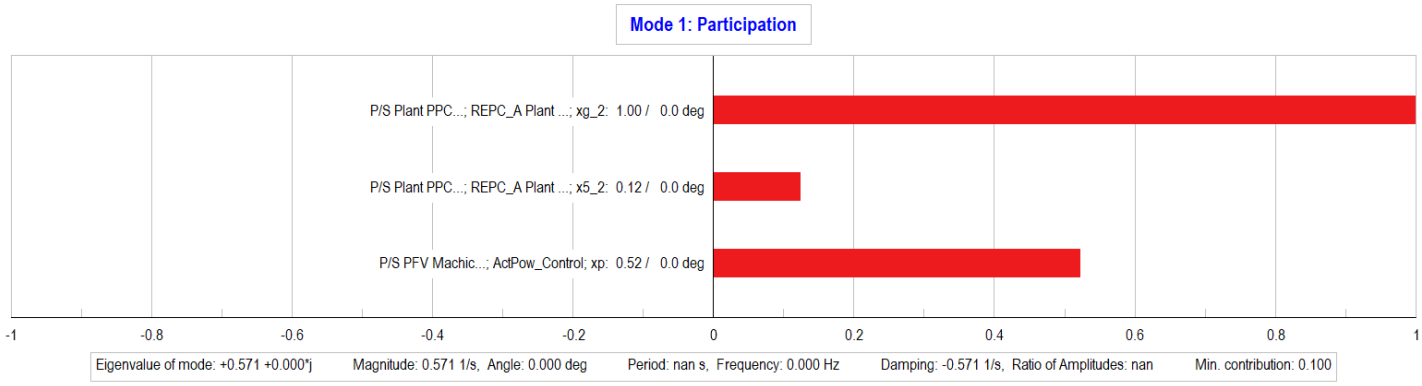


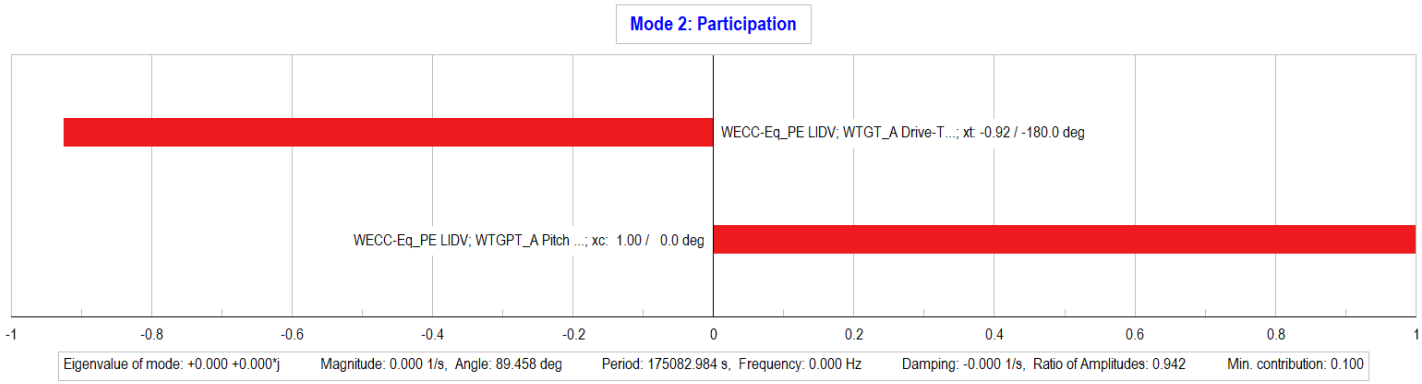
Eigenvalue of mode: -0.442 +9.038*j Period: 0.695 s, Frequency: 1.438 Hz Min. contribution: 0.100
Magnitude: 9.049 1/s, Angle: 92.801 deg Damping: 0.442 1/s, Ratio of Amplitudes: 1.360

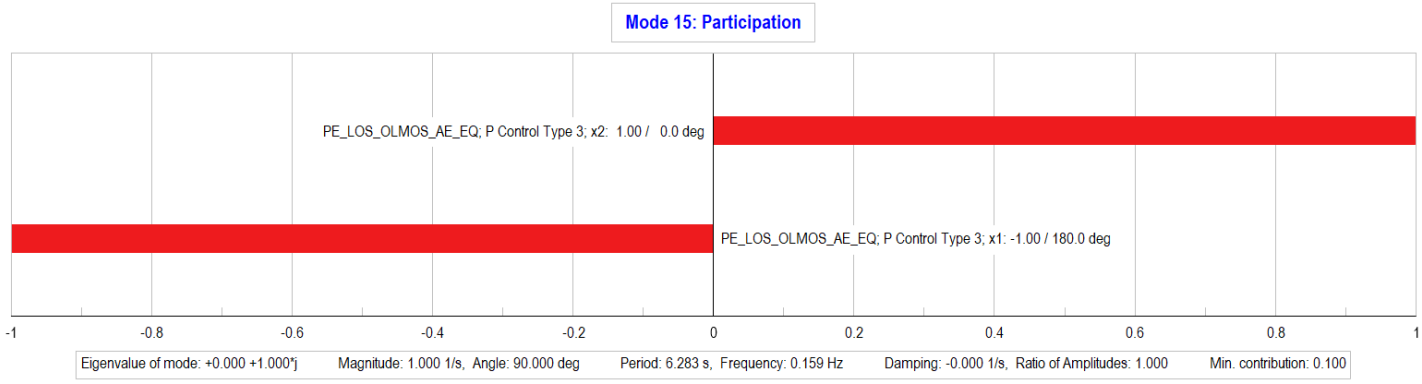
Mode 20: Participation

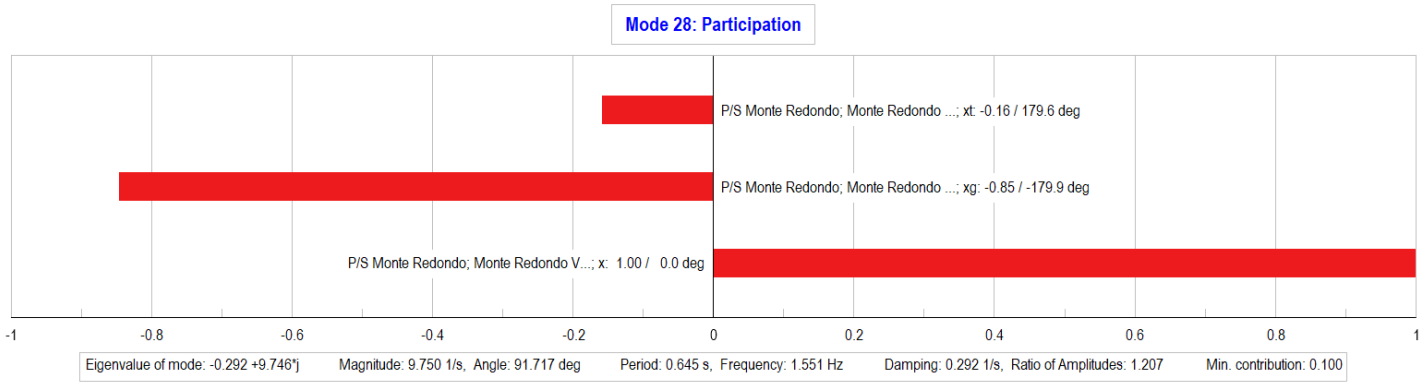


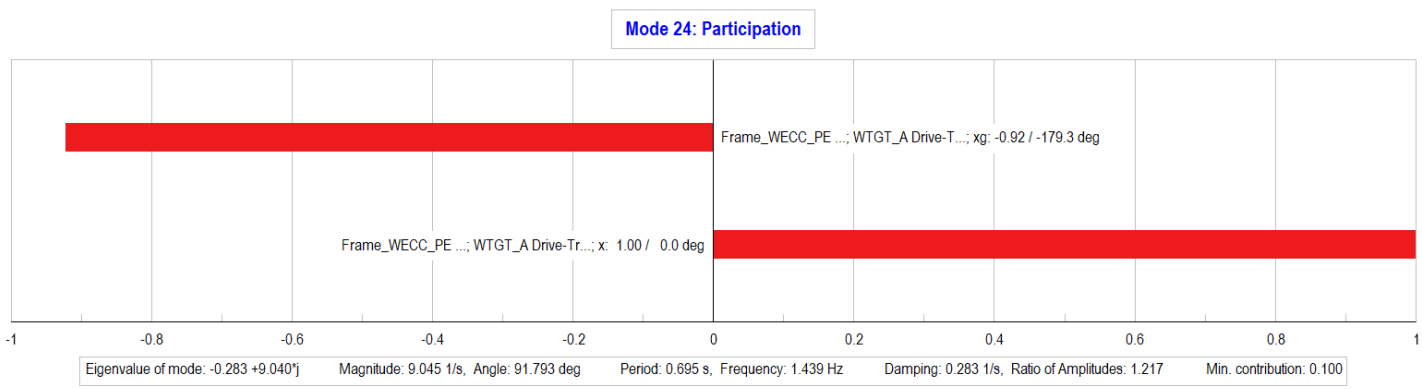
Eigenvalue of mode: -0.264 +5.359*j Period: 1.172 s, Frequency: 0.853 Hz Min. contribution: 0.100
Magnitude: 5.366 1/s, Angle: 92.824 deg Damping: 0.264 1/s, Ratio of Amplitudes: 1.363

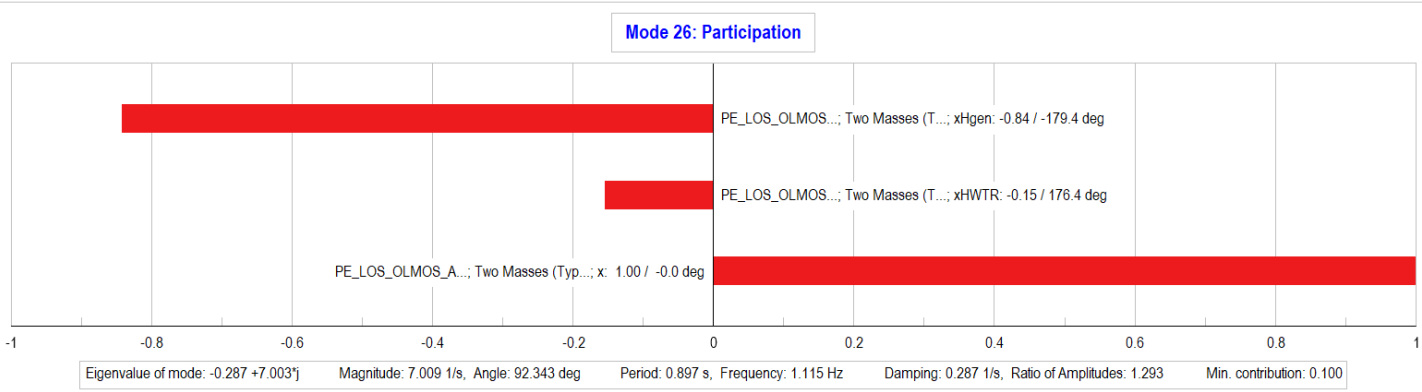

Mode 1: Participation
P/S Plant PPC...; REPC_A Plant ...; xg_2: 1.00 / 0.0 deg
P/S Plant PPC...; REPC_A Plant ...; x5_2: 0.12 / 0.0 deg
P/S PFV Machic...; ActPow_Control; xp: 0.52 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.571 +0.000*j
Magnitude: 0.571 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.571 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100


Mode 2: Participation
WECC-Eq_PE LIDV; WTGT_A Drive-T...; xt: -0.92 / -180.0 deg
WECC-Eq_PE LIDV; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 89.458 deg
Period: 175082.984 s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 0.942
Min. contribution: 0.100


Mode 15: Participation
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x2: 1.00 / 0.0 deg
PE_LOS_OLMOS_AE_EQ; P Control Type 3; x1: -1.00 / 180.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +1.000*j
Magnitude: 1.000 1/s, Angle: 90.000 deg
Period: 6.283 s, Frequency: 0.159 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: 1.000
Min. contribution: 0.100

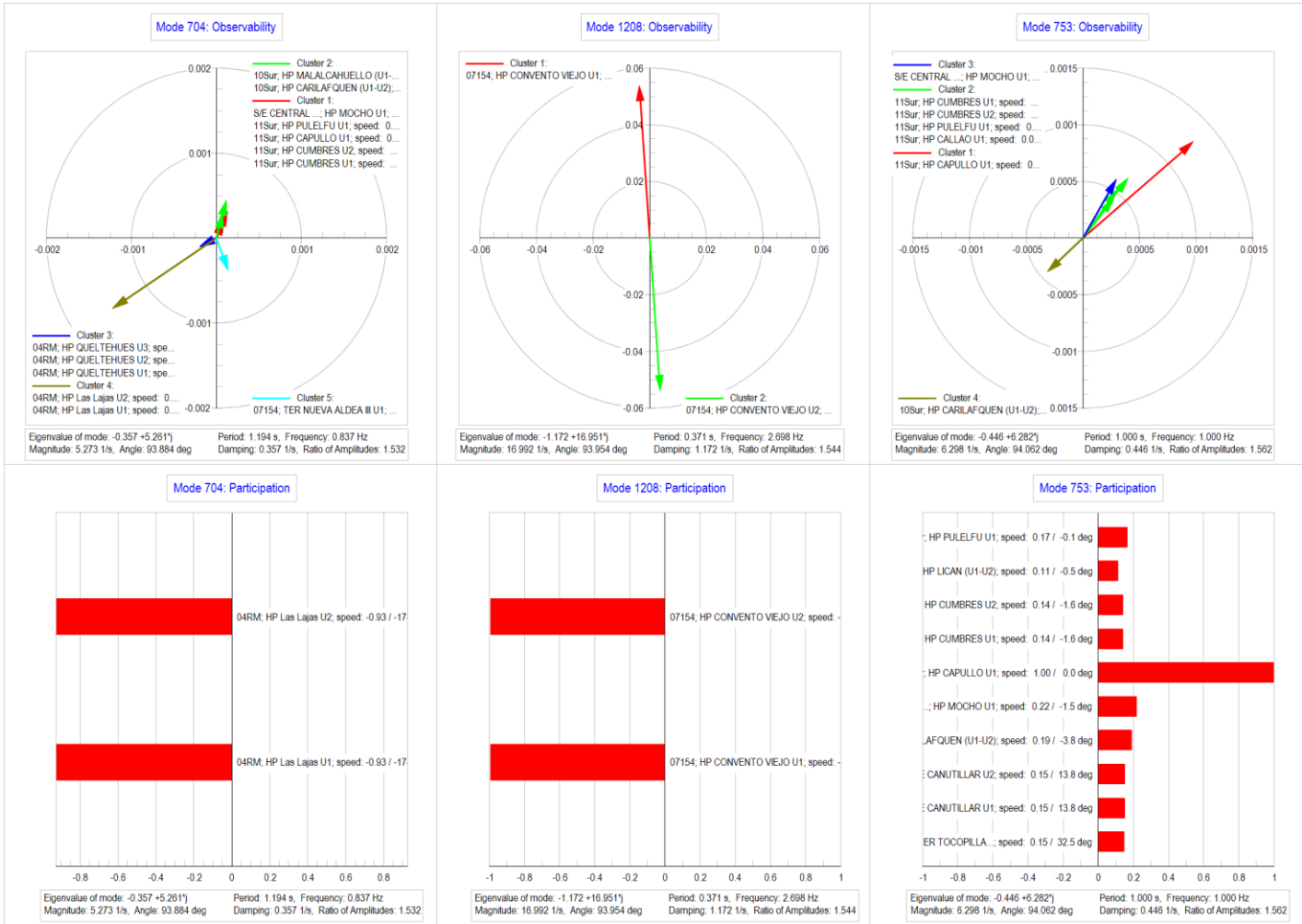

Mode 28: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.6 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.85 / -179.9 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.292 +9.746*j
Magnitude: 9.750 1/s, Angle: 91.717 deg
Period: 0.645 s, Frequency: 1.551 Hz
Damping: 0.292 1/s, Ratio of Amplitudes: 1.207
Min. contribution: 0.100


Mode 24: Participation
Frame_WECC_PE ...; WTGT_A Drive-T...; xg: -0.92 / -179.3 deg
Frame_WECC_PE ...; WTGT_A Drive-Tr...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.283 +9.040*j
Magnitude: 9.045 1/s, Angle: 91.793 deg
Period: 0.695 s, Frequency: 1.439 Hz
Damping: 0.283 1/s, Ratio of Amplitudes: 1.217
Min. contribution: 0.100

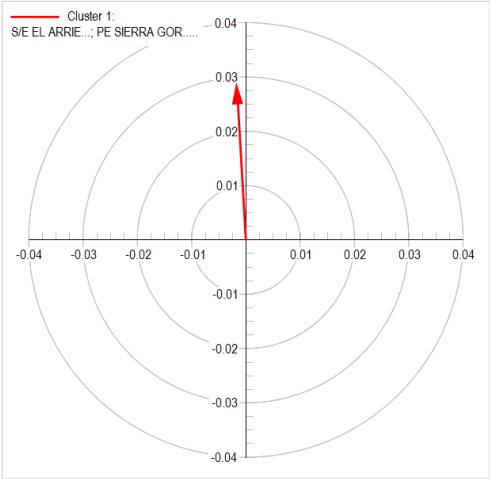

Mode 26: Participation
PE_LOS_OLMOS...; Two Masses (T...; xHgen: -0.84 / -179.4 deg
PE_LOS_OLMOS...; Two Masses (T...; xHWTR: -0.15 / 176.4 deg
PE_LOS_OLMOS_A...; Two Masses (Typ...; x: 1.00 / -0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.287 +7.003*j
Magnitude: 7.009 1/s, Angle: 92.343 deg
Period: 0.897 s, Frequency: 1.115 Hz
Damping: 0.287 1/s, Ratio of Amplitudes: 1.293
Min. contribution: 0.100

15.4 Escenario E4 DB noche Dic2024

15.4.1 Red N

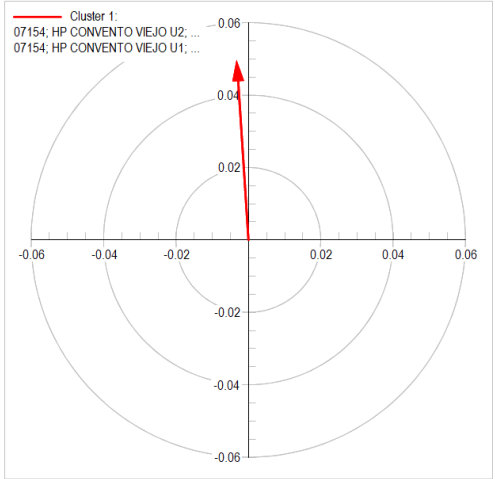


Mode 935: Observability



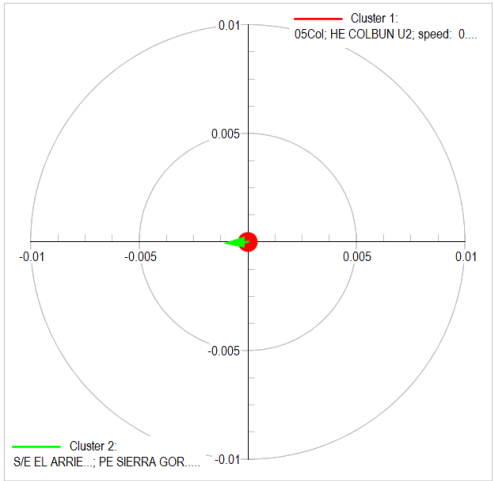
Eigenvalue of mode: -0.594 +9.795*j
Magnitude: 9.813 1/s, Angle: 93.468 deg
Period: 0.641 s, Frequency: 1.559 Hz
Damping: 0.594 1/s, Ratio of Amplitudes: 1.463

Mode 1087: Observability



Eigenvalue of mode: -0.997 +15.534*j
Magnitude: 15.566 1/s, Angle: 93.672 deg
Period: 0.404 s, Frequency: 2.472 Hz
Damping: 0.997 1/s, Ratio of Amplitudes: 1.497

Mode 960: Observability

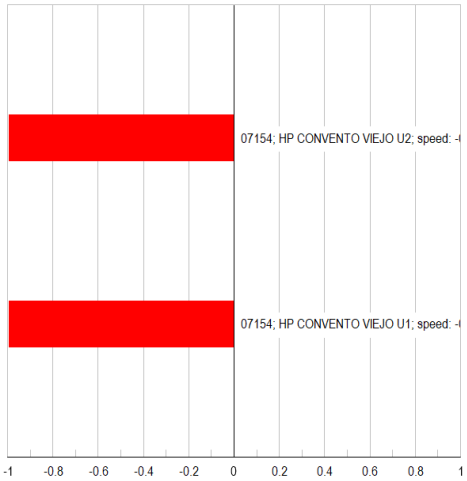


Eigenvalue of mode: -0.662 +9.931*j
Magnitude: 9.953 1/s, Angle: 93.811 deg
Period: 0.633 s, Frequency: 1.581 Hz
Damping: 0.662 1/s, Ratio of Amplitudes: 1.520

Mode 935: Participation

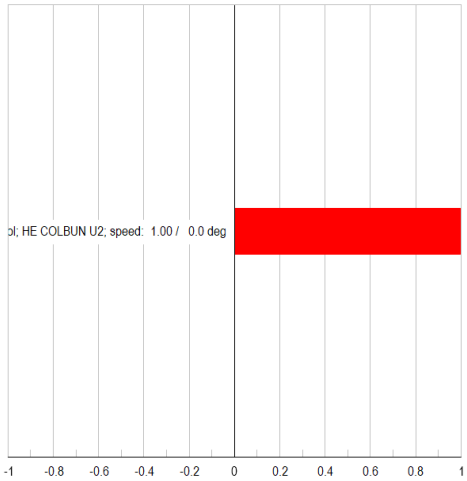
Eigenvalue of mode: -0.594 +9.795*j
Magnitude: 9.813 1/s, Angle: 93.468 deg
Period: 0.641 s, Frequency: 1.559 Hz
Damping: 0.594 1/s, Ratio of Amplitudes: 1.463

Mode 1087: Participation



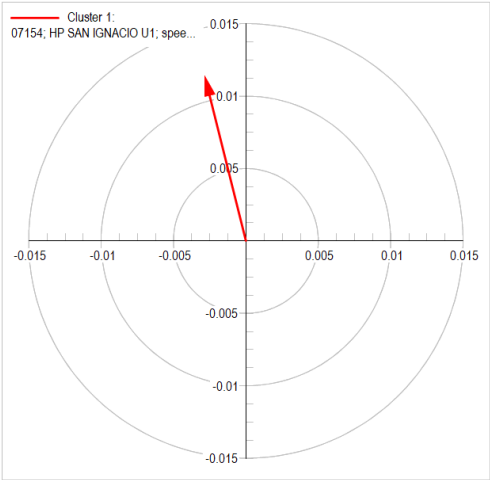
Eigenvalue of mode: -0.997 +15.534*j
Magnitude: 15.566 1/s, Angle: 93.672 deg
Period: 0.404 s, Frequency: 2.472 Hz
Damping: 0.997 1/s, Ratio of Amplitudes: 1.497

Mode 960: Participation



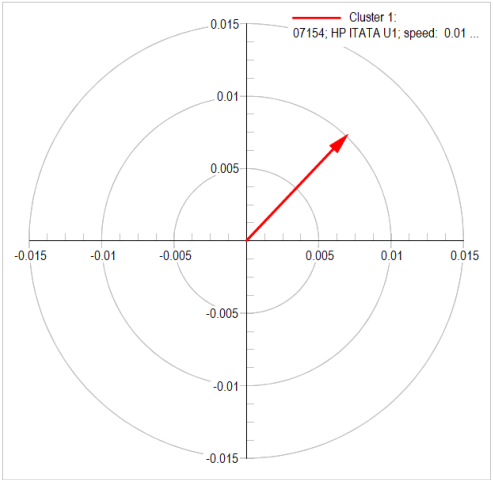
Eigenvalue of mode: -0.662 +9.931*j
Magnitude: 9.953 1/s, Angle: 93.811 deg
Period: 0.633 s, Frequency: 1.581 Hz
Damping: 0.662 1/s, Ratio of Amplitudes: 1.520

Mode 954: Observability



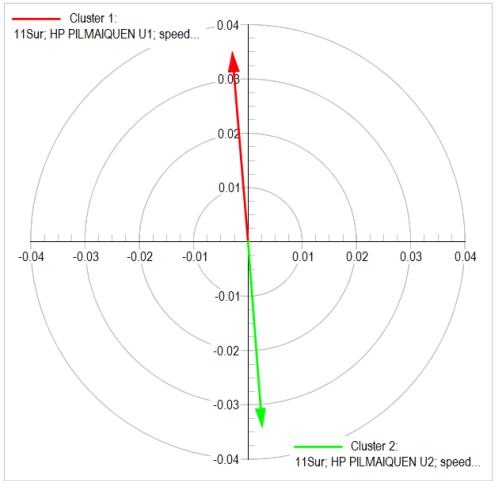
Eigenvalue of mode: -0.637 +8.615*j
Magnitude: 8.638 1/s, Angle: 94.230 deg
Period: 0.729 s, Frequency: 1.371 Hz
Damping: 0.637 1/s, Ratio of Amplitudes: 1.592

Mode 885: Observability



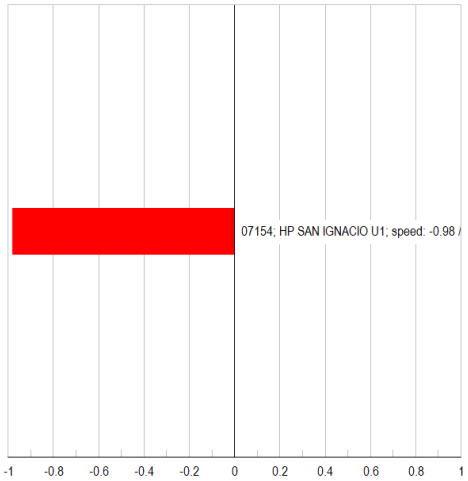
Eigenvalue of mode: -0.504 +6.394*j
Magnitude: 6.414 1/s, Angle: 94.505 deg
Period: 0.983 s, Frequency: 1.018 Hz
Damping: 0.504 1/s, Ratio of Amplitudes: 1.640

Mode 1042: Observability



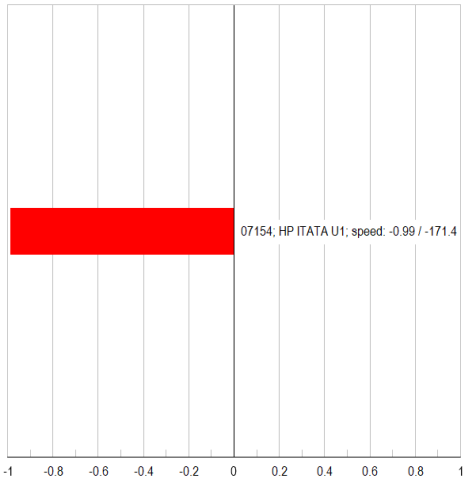
Eigenvalue of mode: -0.898 +11.009*j
Magnitude: 11.046 1/s, Angle: 94.665 deg
Period: 0.571 s, Frequency: 1.752 Hz
Damping: 0.898 1/s, Ratio of Amplitudes: 1.670

Mode 954: Participation



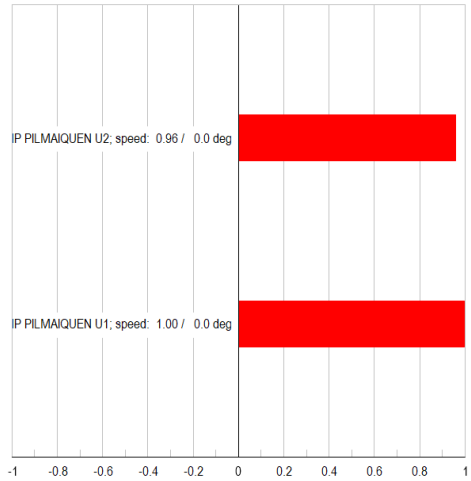
Eigenvalue of mode: -0.637 +8.615*j
Magnitude: 8.638 1/s, Angle: 94.230 deg
Period: 0.729 s, Frequency: 1.371 Hz
Damping: 0.637 1/s, Ratio of Amplitudes: 1.592

Mode 885: Participation



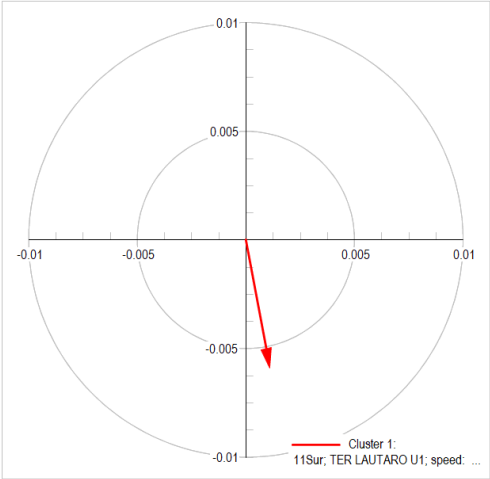
Eigenvalue of mode: -0.504 +6.394*j
Magnitude: 6.414 1/s, Angle: 94.505 deg
Period: 0.983 s, Frequency: 1.018 Hz
Damping: 0.504 1/s, Ratio of Amplitudes: 1.640

Mode 1042: Participation



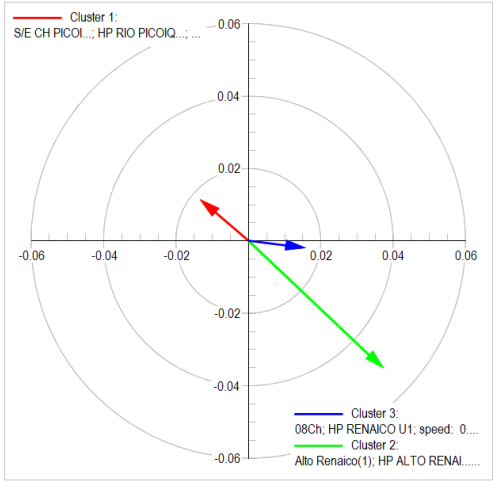
Eigenvalue of mode: -0.898 +11.009*j
Magnitude: 11.046 1/s, Angle: 94.665 deg
Period: 0.571 s, Frequency: 1.752 Hz
Damping: 0.898 1/s, Ratio of Amplitudes: 1.670

Mode 962: Observability



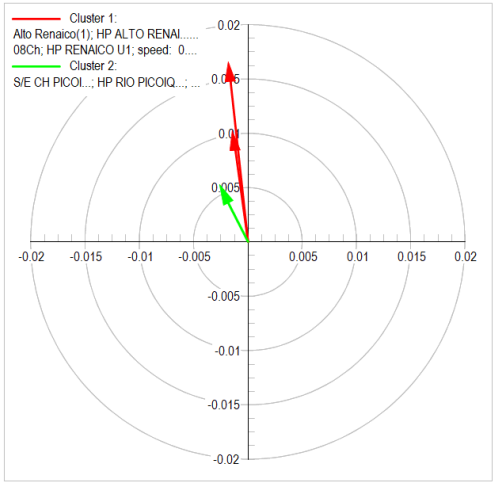
Eigenvalue of mode: -0.662 +7.423*j
Magnitude: 7.453 1/s, Angle: 95.096 deg
Period: 0.846 s, Frequency: 1.181 Hz
Damping: 0.662 1/s, Ratio of Amplitudes: 1.751

Mode 1366: Observability



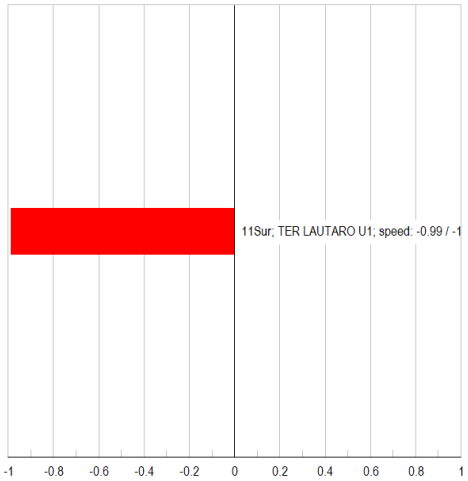
Eigenvalue of mode: -1.855 +20.760*j
Magnitude: 20.843 1/s, Angle: 95.105 deg
Period: 0.303 s, Frequency: 3.304 Hz
Damping: 1.855 1/s, Ratio of Amplitudes: 1.753

Mode 1322: Observability



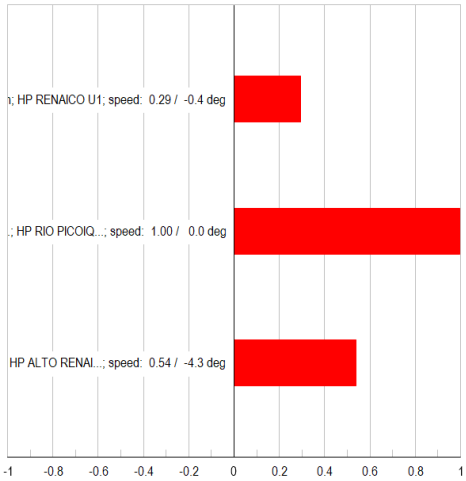
Eigenvalue of mode: -1.577 +17.068*j
Magnitude: 17.141 1/s, Angle: 95.280 deg
Period: 0.368 s, Frequency: 2.716 Hz
Damping: 1.577 1/s, Ratio of Amplitudes: 1.787

Mode 962: Participation



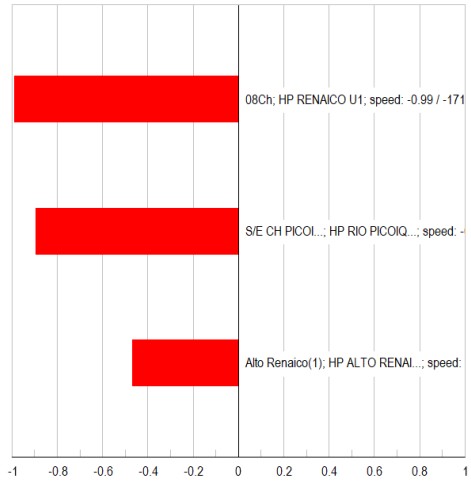
Eigenvalue of mode: -0.662 +7.423*j
Magnitude: 7.453 1/s, Angle: 95.096 deg
Period: 0.846 s, Frequency: 1.181 Hz
Damping: 0.662 1/s, Ratio of Amplitudes: 1.751

Mode 1366: Participation



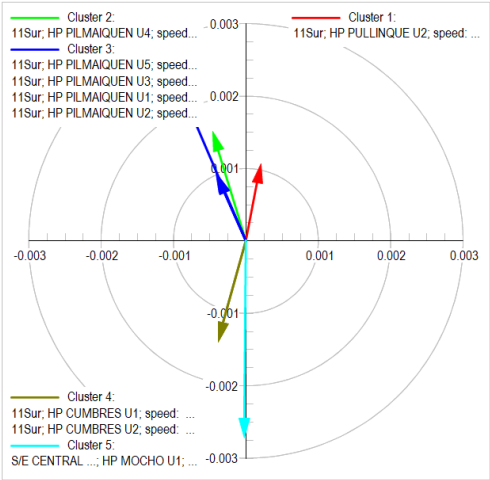
Eigenvalue of mode: -1.855 +20.760*j
Magnitude: 20.843 1/s, Angle: 95.105 deg
Period: 0.303 s, Frequency: 3.304 Hz
Damping: 1.855 1/s, Ratio of Amplitudes: 1.753

Mode 1322: Participation



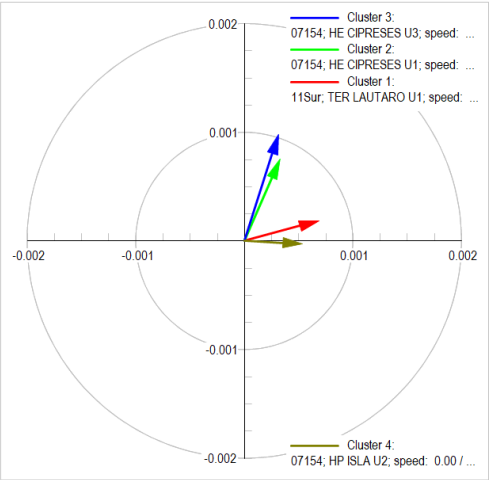
Eigenvalue of mode: -1.577 +17.068*j
Magnitude: 17.141 1/s, Angle: 95.280 deg
Period: 0.368 s, Frequency: 2.716 Hz
Damping: 1.577 1/s, Ratio of Amplitudes: 1.787

Mode 998: Observability



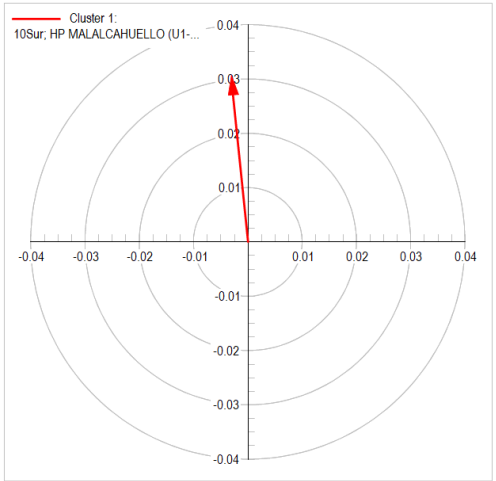
Eigenvalue of mode: -0.766 +8.141*j
Magnitude: 8.177 1/s, Angle: 95.378 deg
Period: 0.772 s, Frequency: 1.296 Hz
Damping: 0.766 1/s, Ratio of Amplitudes: 1.807

Mode 992: Observability



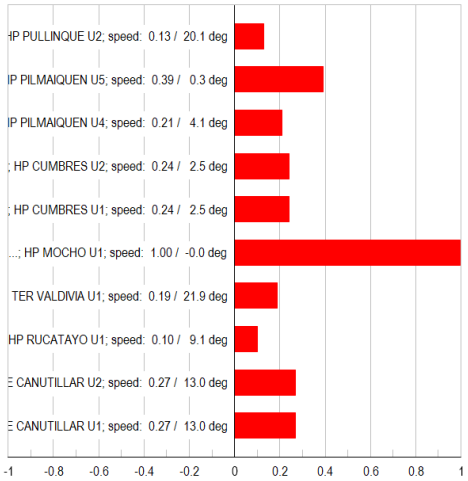
Eigenvalue of mode: -0.742 +7.460*j
Magnitude: 7.497 1/s, Angle: 95.682 deg
Period: 0.842 s, Frequency: 1.187 Hz
Damping: 0.742 1/s, Ratio of Amplitudes: 1.868

Mode 1073: Observability



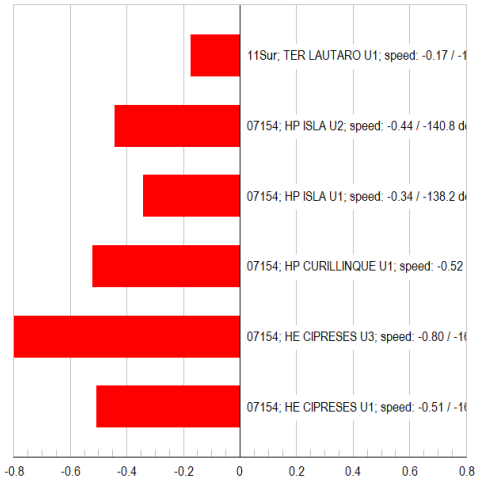
Eigenvalue of mode: -0.962 +9.663*j
Magnitude: 9.710 1/s, Angle: 95.684 deg
Period: 0.650 s, Frequency: 1.538 Hz
Damping: 0.962 1/s, Ratio of Amplitudes: 1.869

Mode 998: Participation



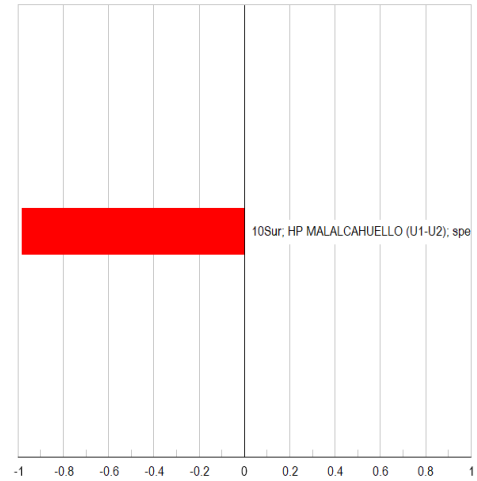
Eigenvalue of mode: -0.766 +8.141*j
Magnitude: 8.177 1/s, Angle: 95.378 deg
Period: 0.772 s, Frequency: 1.296 Hz
Damping: 0.766 1/s, Ratio of Amplitudes: 1.807

Mode 992: Participation



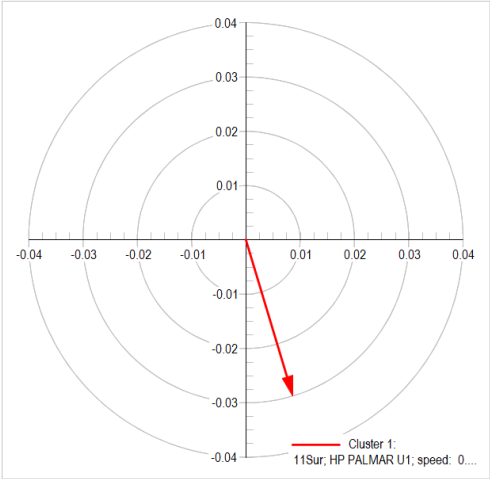
Eigenvalue of mode: -0.742 +7.460*j
Magnitude: 7.497 1/s, Angle: 95.682 deg
Period: 0.842 s, Frequency: 1.187 Hz
Damping: 0.742 1/s, Ratio of Amplitudes: 1.868

Mode 1073: Participation



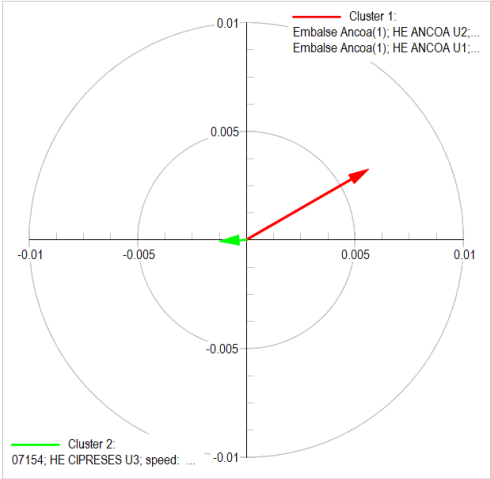
Eigenvalue of mode: -0.962 +9.663*j
Magnitude: 9.710 1/s, Angle: 95.684 deg
Period: 0.650 s, Frequency: 1.538 Hz
Damping: 0.962 1/s, Ratio of Amplitudes: 1.869

Mode 1037: Observability



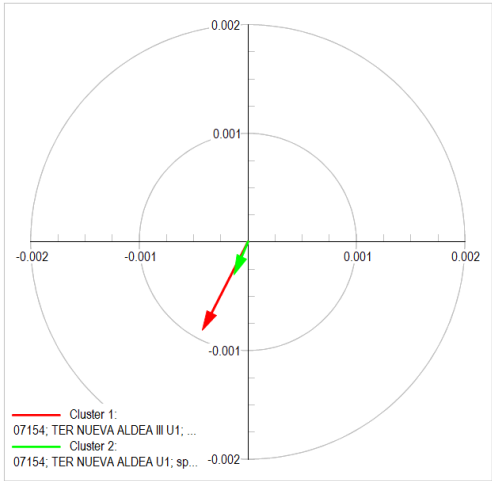
Eigenvalue of mode: -0.867 +9.384*j
Magnitude: 9.424 1/s, Angle: 95.281 deg
Period: 0.670 s, Frequency: 1.493 Hz
Damping: 0.867 1/s, Ratio of Amplitudes: 1.787

Mode 994: Observability



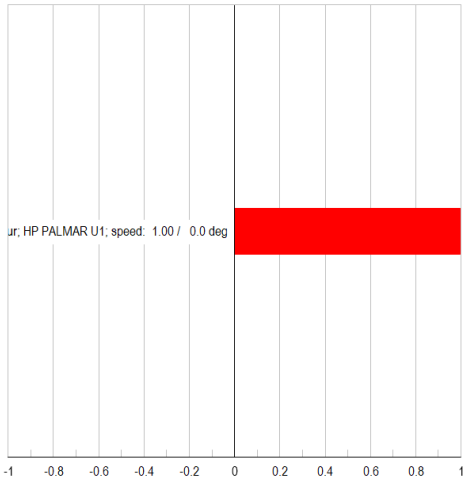
Eigenvalue of mode: -0.750 +8.026*j
Magnitude: 8.061 1/s, Angle: 95.336 deg
Period: 0.783 s, Frequency: 1.277 Hz
Damping: 0.750 1/s, Ratio of Amplitudes: 1.798

Mode 771: Observability



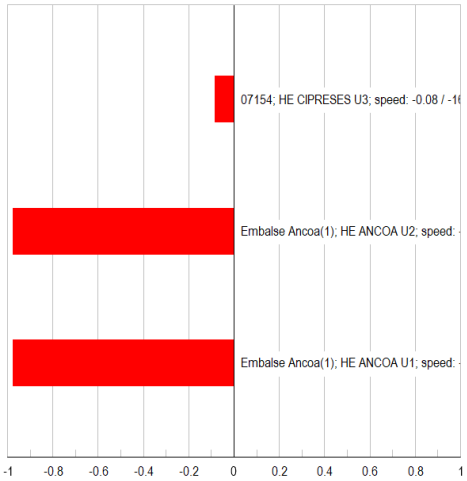
Eigenvalue of mode: -0.467 +4.978*j
Magnitude: 5.000 1/s, Angle: 95.362 deg
Period: 1.262 s, Frequency: 0.792 Hz
Damping: 0.467 1/s, Ratio of Amplitudes: 1.803

Mode 1037: Participation



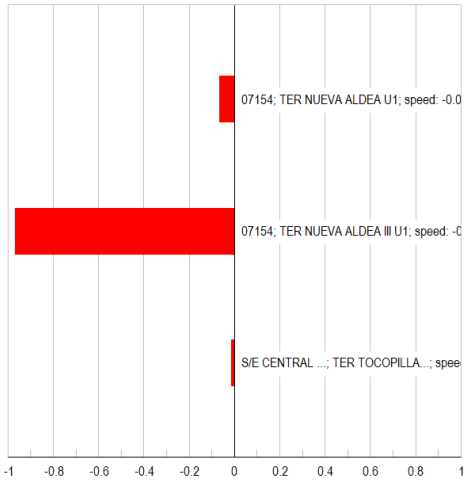
Eigenvalue of mode: -0.867 +9.384*j
Magnitude: 9.424 1/s, Angle: 95.281 deg
Period: 0.670 s, Frequency: 1.493 Hz
Damping: 0.867 1/s, Ratio of Amplitudes: 1.787

Mode 994: Participation



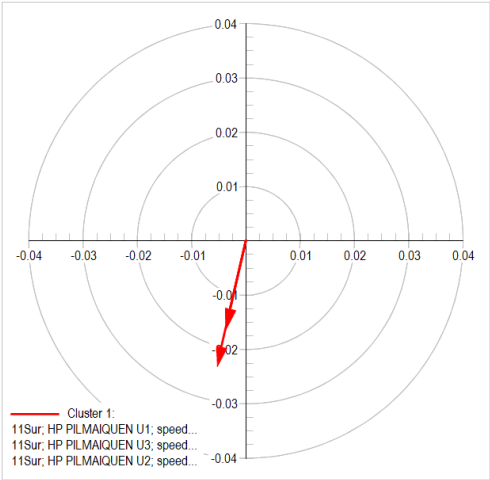
Eigenvalue of mode: -0.750 +8.026*j
Magnitude: 8.061 1/s, Angle: 95.336 deg
Period: 0.783 s, Frequency: 1.277 Hz
Damping: 0.750 1/s, Ratio of Amplitudes: 1.798

Mode 771: Participation



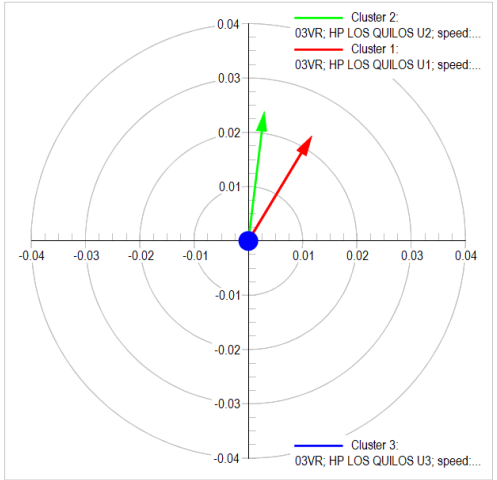
Eigenvalue of mode: -0.467 +4.978*j
Magnitude: 5.000 1/s, Angle: 95.362 deg
Period: 1.262 s, Frequency: 0.792 Hz
Damping: 0.467 1/s, Ratio of Amplitudes: 1.803

Mode 1057: Observability



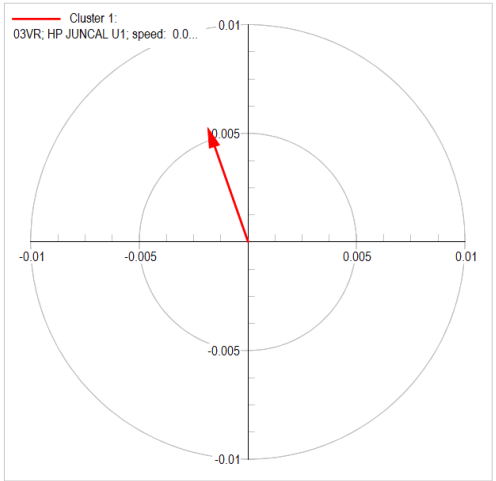
Eigenvalue of mode: -0.928 +10.689*j
Magnitude: 10.729 1/s, Angle: 94.962 deg
Period: 0.588 s, Frequency: 1.701 Hz
Damping: 0.928 1/s, Ratio of Amplitudes: 1.726

Mode 1059: Observability



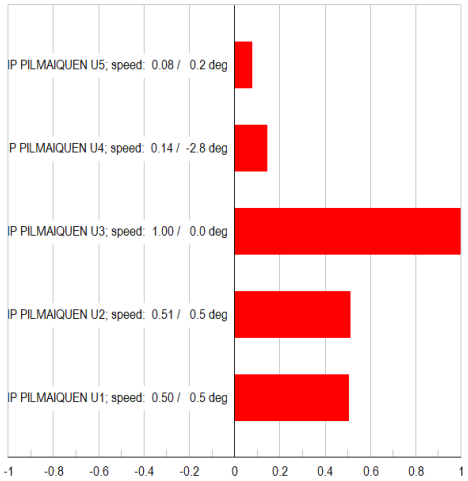
Eigenvalue of mode: -0.928 +10.657*j
Magnitude: 10.698 1/s, Angle: 94.978 deg
Period: 0.590 s, Frequency: 1.696 Hz
Damping: 0.928 1/s, Ratio of Amplitudes: 1.729

Mode 1010: Observability



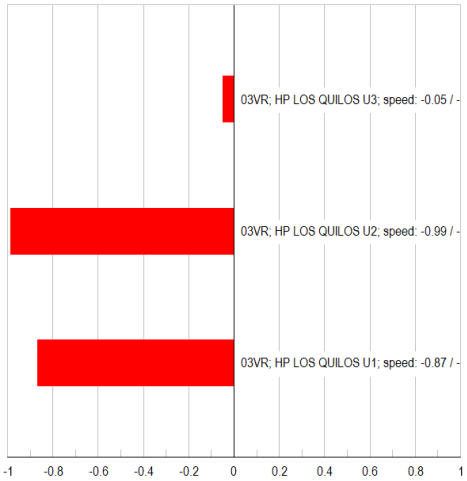
Eigenvalue of mode: -0.789 +9.032*j
Magnitude: 9.066 1/s, Angle: 94.995 deg
Period: 0.696 s, Frequency: 1.437 Hz
Damping: 0.789 1/s, Ratio of Amplitudes: 1.732

Mode 1057: Participation



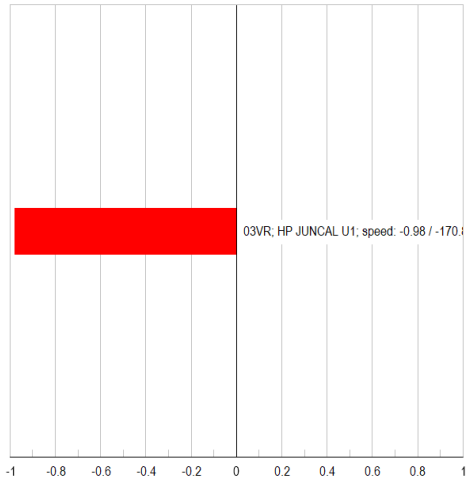
Eigenvalue of mode: -0.928 +10.689*j
Magnitude: 10.729 1/s, Angle: 94.962 deg
Period: 0.588 s, Frequency: 1.701 Hz
Damping: 0.928 1/s, Ratio of Amplitudes: 1.726

Mode 1059: Participation



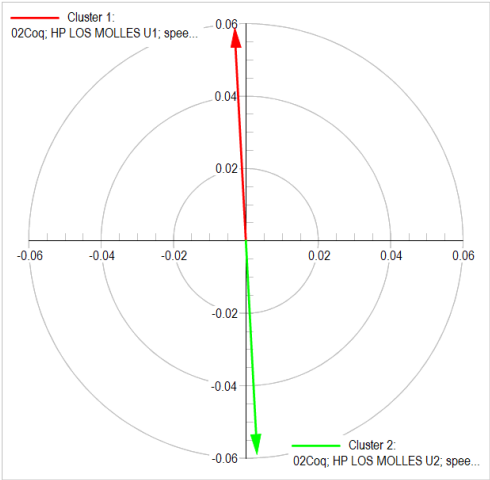
Eigenvalue of mode: -0.928 +10.657*j
Magnitude: 10.698 1/s, Angle: 94.978 deg
Period: 0.590 s, Frequency: 1.696 Hz
Damping: 0.928 1/s, Ratio of Amplitudes: 1.729

Mode 1010: Participation



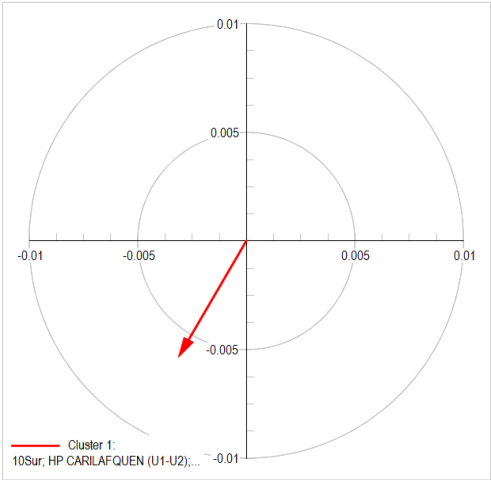
Eigenvalue of mode: -0.789 +9.032*j
Magnitude: 9.066 1/s, Angle: 94.995 deg
Period: 0.696 s, Frequency: 1.437 Hz
Damping: 0.789 1/s, Ratio of Amplitudes: 1.732

Mode 1079: Observability



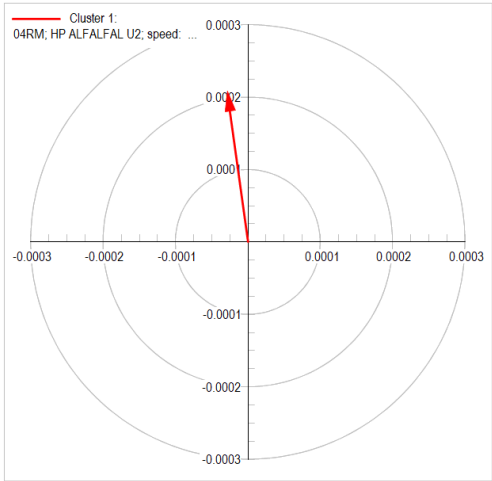
Eigenvalue of mode: -0.974 +18.519*j
Magnitude: 18.545 1/s, Angle: 93.010 deg
Period: 0.339 s, Frequency: 2.947 Hz
Damping: 0.974 1/s, Ratio of Amplitudes: 1.392

Mode 677: Observability



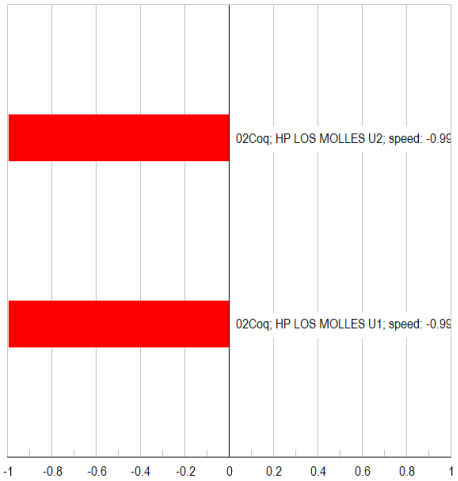
Eigenvalue of mode: -0.314 +5.792*j
Magnitude: 5.800 1/s, Angle: 93.102 deg
Period: 1.085 s, Frequency: 0.922 Hz
Damping: 0.314 1/s, Ratio of Amplitudes: 1.406

Mode 905: Observability



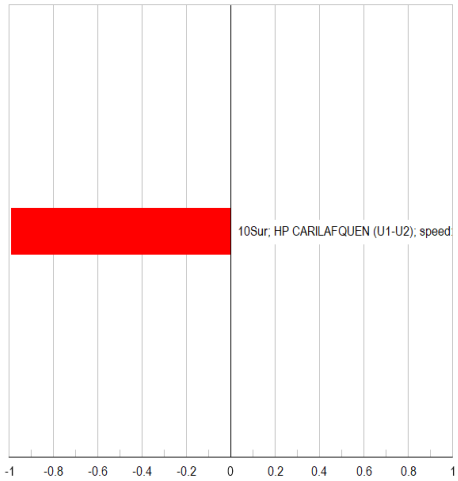
Eigenvalue of mode: -0.544 +9.519*j
Magnitude: 9.535 1/s, Angle: 93.270 deg
Period: 0.660 s, Frequency: 1.515 Hz
Damping: 0.544 1/s, Ratio of Amplitudes: 1.432

Mode 1079: Participation



Eigenvalue of mode: -0.974 +18.519*j
Magnitude: 18.545 1/s, Angle: 93.010 deg
Period: 0.339 s, Frequency: 2.947 Hz
Damping: 0.974 1/s, Ratio of Amplitudes: 1.392

Mode 677: Participation

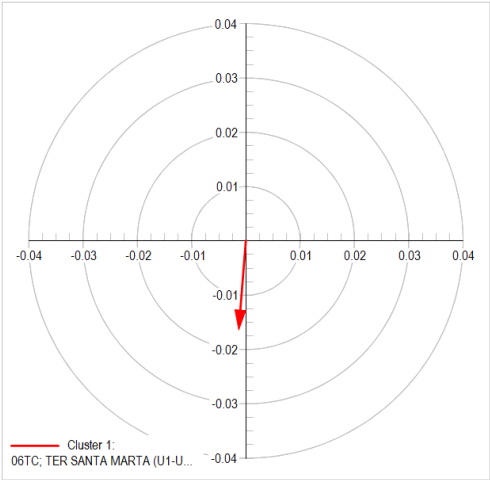


Eigenvalue of mode: -0.314 +5.792*j
Magnitude: 5.800 1/s, Angle: 93.102 deg
Period: 1.085 s, Frequency: 0.922 Hz
Damping: 0.314 1/s, Ratio of Amplitudes: 1.406

Mode 905: Participation

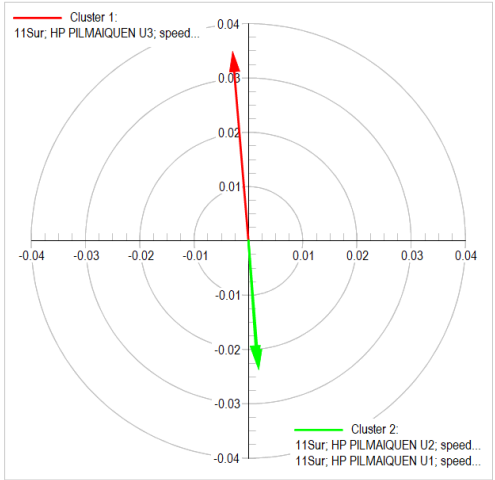
Eigenvalue of mode: -0.544 +9.519*j
Magnitude: 9.535 1/s, Angle: 93.270 deg
Period: 0.660 s, Frequency: 1.515 Hz
Damping: 0.544 1/s, Ratio of Amplitudes: 1.432

Mode 1171: Observability



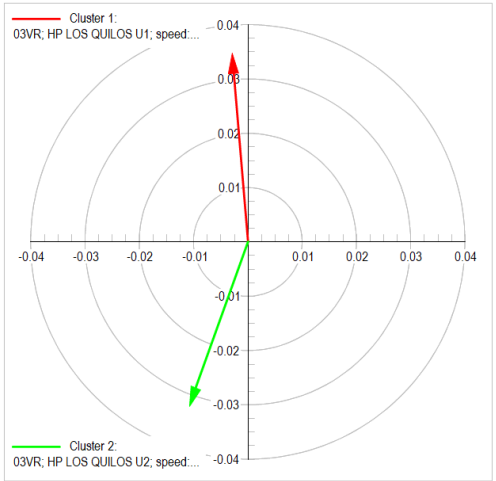
Eigenvalue of mode: -1.058 +12.907*j
Magnitude: 12.950 1/s, Angle: 94.685 deg
Period: 0.487 s, Frequency: 2.054 Hz
Damping: 1.058 1/s, Ratio of Amplitudes: 1.673

Mode 1047: Observability



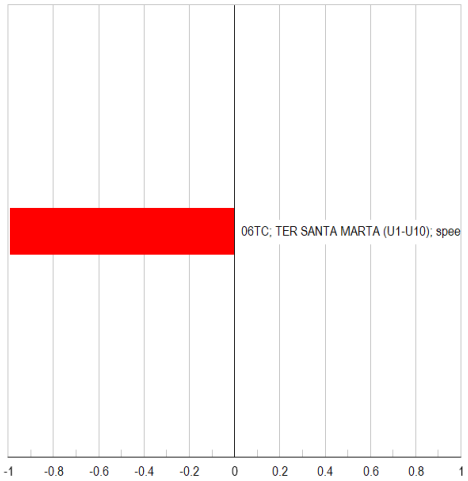
Eigenvalue of mode: -0.906 +10.949*j
Magnitude: 10.986 1/s, Angle: 94.729 deg
Period: 0.574 s, Frequency: 1.743 Hz
Damping: 0.906 1/s, Ratio of Amplitudes: 1.682

Mode 1055: Observability



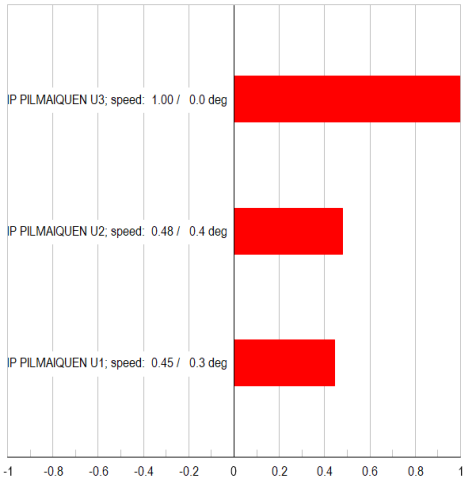
Eigenvalue of mode: -0.922 +10.917*j
Magnitude: 10.956 1/s, Angle: 94.830 deg
Period: 0.576 s, Frequency: 1.738 Hz
Damping: 0.922 1/s, Ratio of Amplitudes: 1.700

Mode 1171: Participation



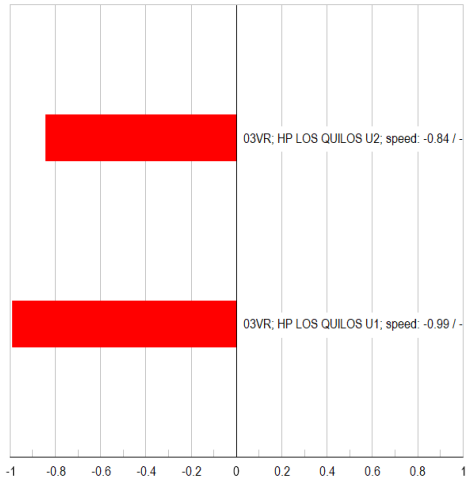
Eigenvalue of mode: -1.058 +12.907*j
Magnitude: 12.950 1/s, Angle: 94.685 deg
Period: 0.487 s, Frequency: 2.054 Hz
Damping: 1.058 1/s, Ratio of Amplitudes: 1.673

Mode 1047: Participation



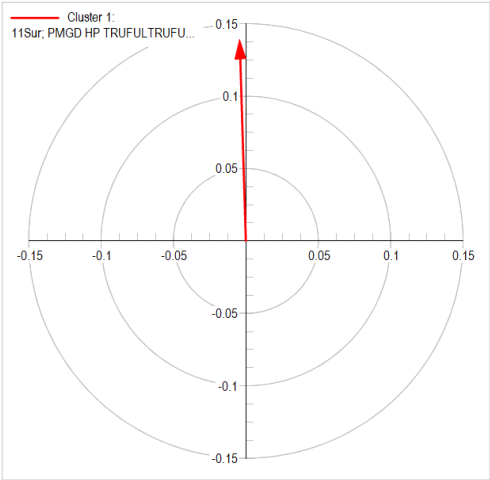
Eigenvalue of mode: -0.906 +10.949*j
Magnitude: 10.986 1/s, Angle: 94.729 deg
Period: 0.574 s, Frequency: 1.743 Hz
Damping: 0.906 1/s, Ratio of Amplitudes: 1.682

Mode 1055: Participation



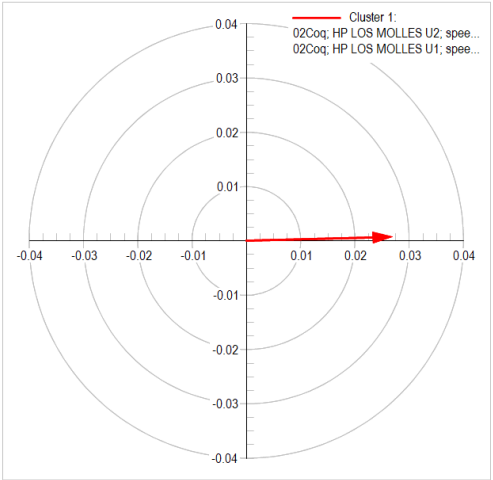
Eigenvalue of mode: -0.922 +10.917*j
Magnitude: 10.956 1/s, Angle: 94.830 deg
Period: 0.576 s, Frequency: 1.738 Hz
Damping: 0.922 1/s, Ratio of Amplitudes: 1.700

Mode 1260: Observability



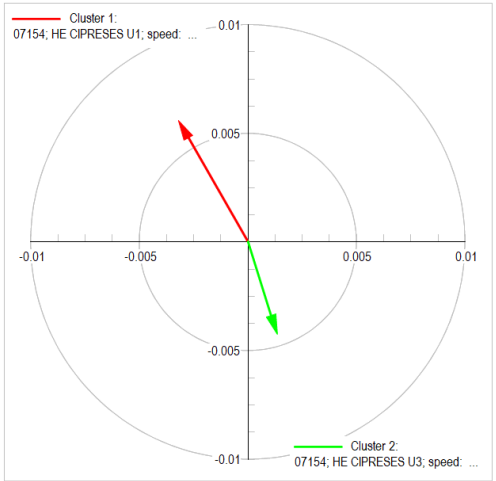
Eigenvalue of mode: -1.340 +43.785*j
Magnitude: 43.805 1/s, Angle: 91.753 deg
Period: 0.144 s, Frequency: 6.969 Hz
Damping: 1.340 1/s, Ratio of Amplitudes: 1.212

Mode 700: Observability



Eigenvalue of mode: -0.346 +11.174*j
Magnitude: 11.179 1/s, Angle: 91.772 deg
Period: 0.562 s, Frequency: 1.778 Hz
Damping: 0.346 1/s, Ratio of Amplitudes: 1.215

Mode 744: Observability

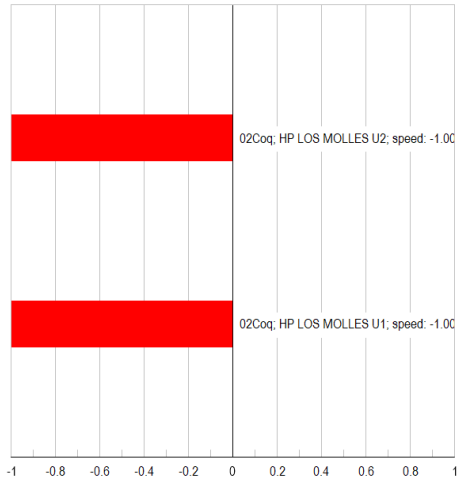


Eigenvalue of mode: -0.432 +8.389*j
Magnitude: 8.400 1/s, Angle: 92.945 deg
Period: 0.749 s, Frequency: 1.335 Hz
Damping: 0.432 1/s, Ratio of Amplitudes: 1.382

Mode 1260: Participation

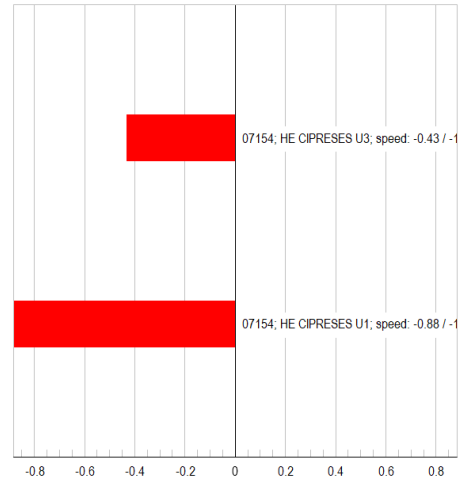
Eigenvalue of mode: -1.340 +43.785*j
Magnitude: 43.805 1/s, Angle: 91.753 deg
Period: 0.144 s, Frequency: 6.969 Hz
Damping: 1.340 1/s, Ratio of Amplitudes: 1.212

Mode 700: Participation

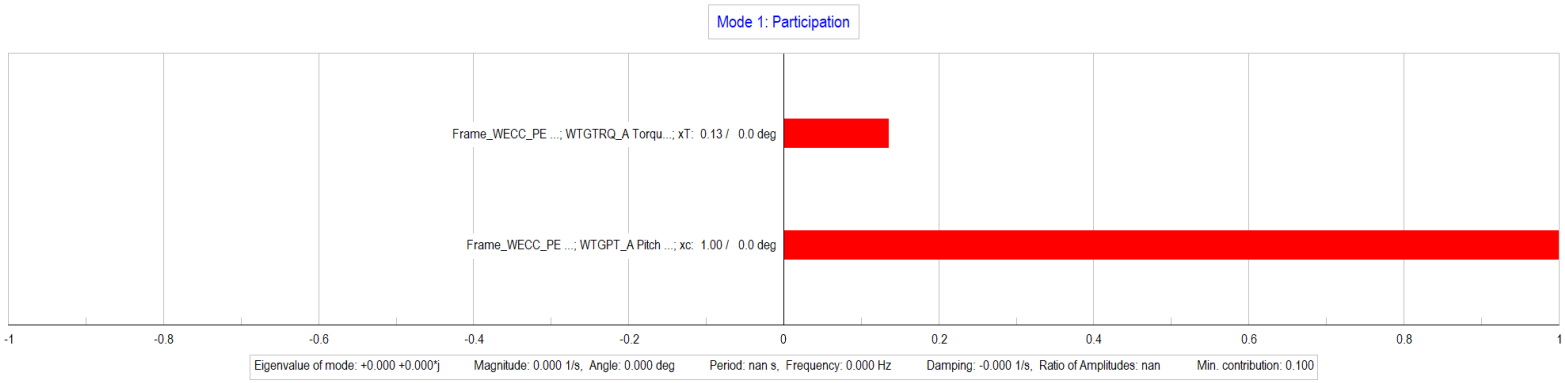


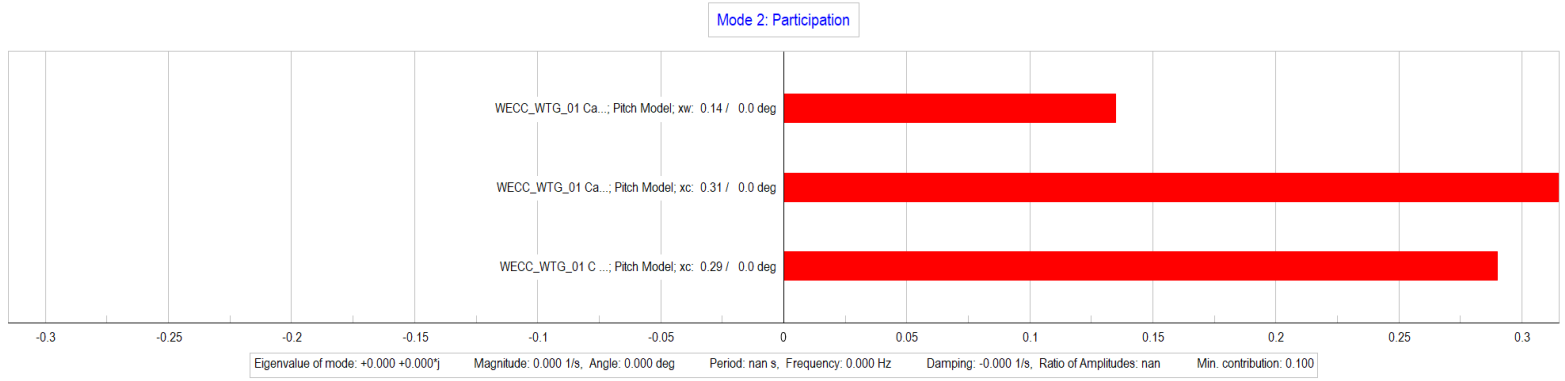
Eigenvalue of mode: -0.346 +11.174*j
Magnitude: 11.179 1/s, Angle: 91.772 deg
Period: 0.562 s, Frequency: 1.778 Hz
Damping: 0.346 1/s, Ratio of Amplitudes: 1.215

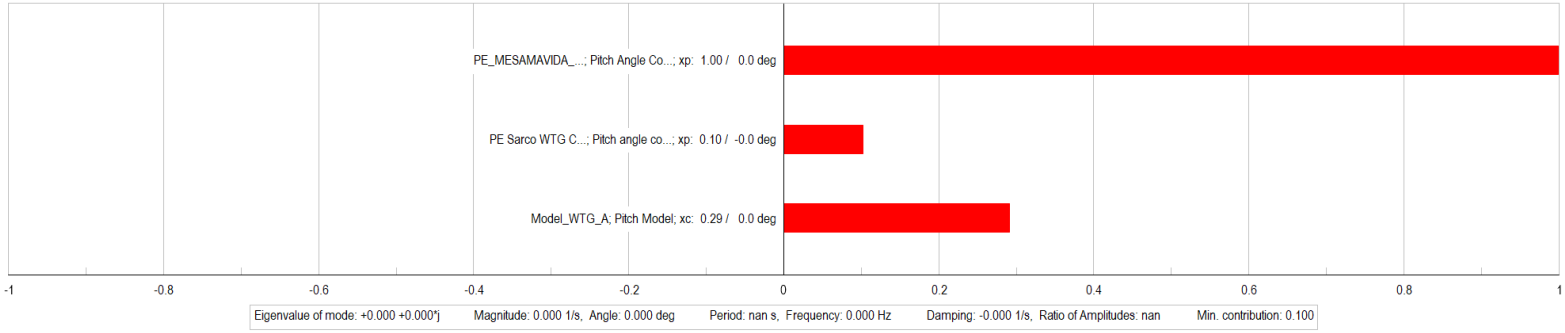
Mode 744: Participation



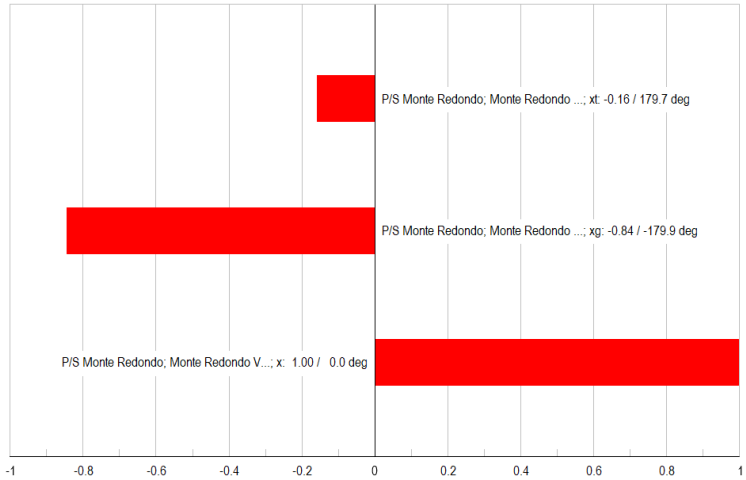
Eigenvalue of mode: -0.432 +8.389*j
Magnitude: 8.400 1/s, Angle: 92.945 deg
Period: 0.749 s, Frequency: 1.335 Hz
Damping: 0.432 1/s, Ratio of Amplitudes: 1.382


Mode 1: Participation
Frame_WECC_PE ...; WTGTRQ_A Torqu...; xT: 0.13 / 0.0 deg
Frame_WECC_PE ...; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j Magnitude: 0.000 1/s, Angle: 0.000 deg Period: nan s, Frequency: 0.000 Hz Damping: -0.000 1/s, Ratio of Amplitudes: nan Min. contribution: 0.100


Mode 2: Participation
WECC_WTG_01 Ca...; Pitch Model; xw: 0.14 / 0.0 deg
WECC_WTG_01 Ca...; Pitch Model; xc: 0.31 / 0.0 deg
WECC_WTG_01 C ...; Pitch Model; xc: 0.29 / 0.0 deg
-0.3 -0.25 -0.2 -0.15 -0.1 -0.05 0 0.05 0.1 0.15 0.2 0.25 0.3
Eigenvalue of mode: +0.000 +0.000*j Magnitude: 0.000 1/s, Angle: 0.000 deg Period: nan s, Frequency: 0.000 Hz Damping: -0.000 1/s, Ratio of Amplitudes: nan Min. contribution: 0.100

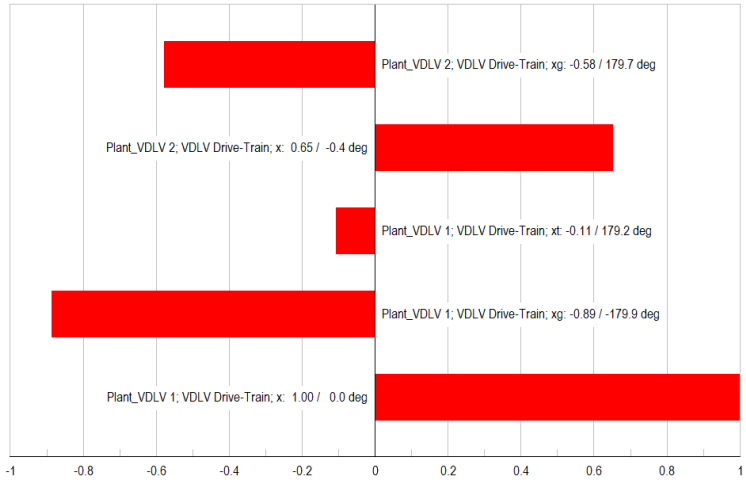

Mode 5: Participation
PE_MESAMAVIDA_...; Pitch Angle Co...; xp: 1.00 / 0.0 deg
PE Sarco WTG C...; Pitch angle co...; xp: 0.10 / -0.0 deg
Model_WTG_A; Pitch Model; xc: 0.29 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j Magnitude: 0.000 1/s, Angle: 0.000 deg Period: nan s, Frequency: 0.000 Hz Damping: -0.000 1/s, Ratio of Amplitudes: nan Min. contribution: 0.100

Mode 660: Participation



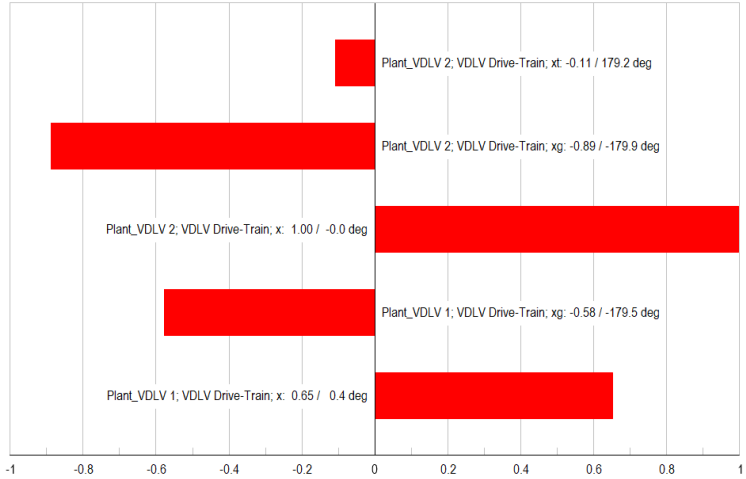
Eigenvalue of mode: -0.275 +9.741*j Period: 0.645 s, Frequency: 1.550 Hz Min. contribution: 0.100
Magnitude: 9.745 1/s, Angle: 91.615 deg Damping: 0.275 1/s, Ratio of Amplitudes: 1.194

Mode 767: Participation



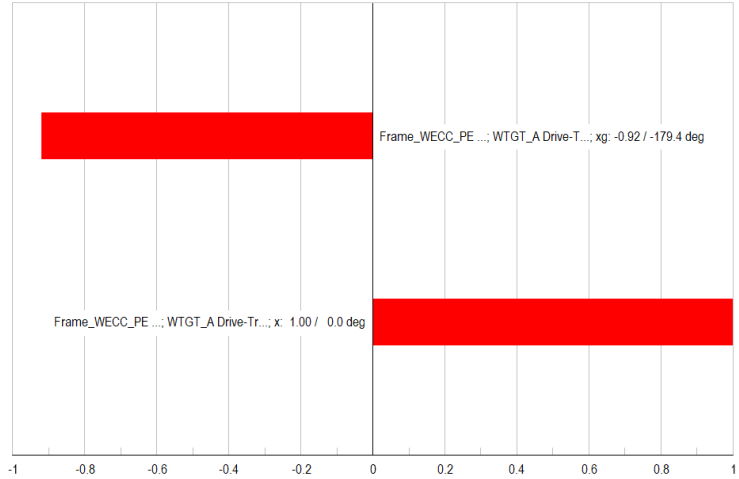
Eigenvalue of mode: -0.464 +12.570*j Period: 0.500 s, Frequency: 2.001 Hz Min. contribution: 0.100
Magnitude: 12.579 1/s, Angle: 92.114 deg Damping: 0.464 1/s, Ratio of Amplitudes: 1.261

Mode 769: Participation

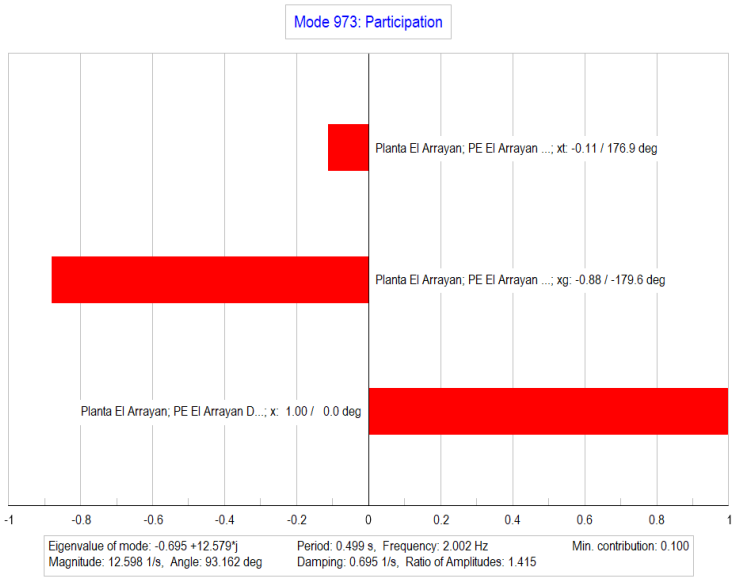


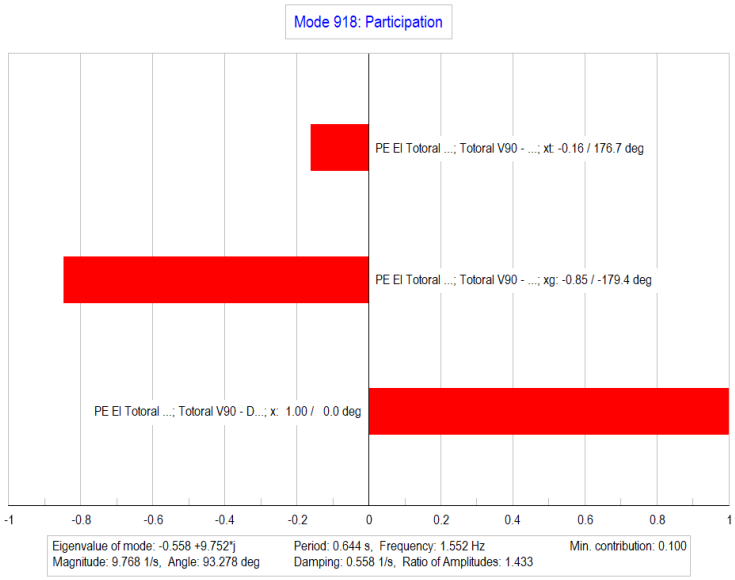
Eigenvalue of mode: -0.464 +12.570*j Period: 0.500 s, Frequency: 2.001 Hz Min. contribution: 0.100
Magnitude: 12.579 1/s, Angle: 92.114 deg Damping: 0.464 1/s, Ratio of Amplitudes: 1.261

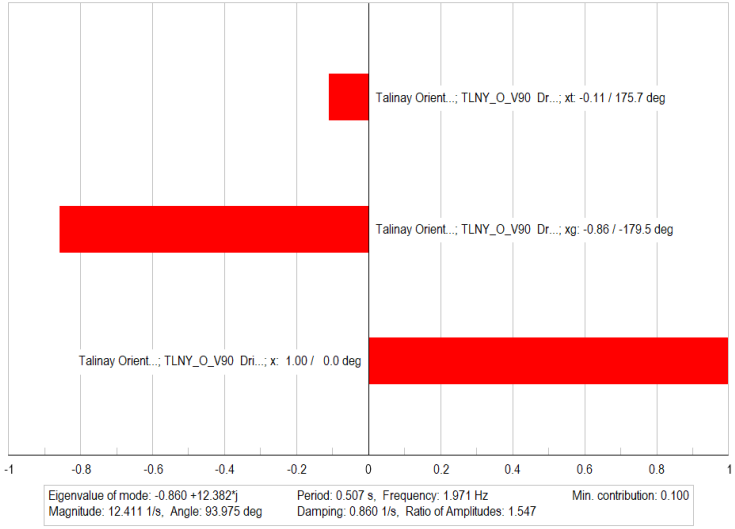
Mode 706: Participation

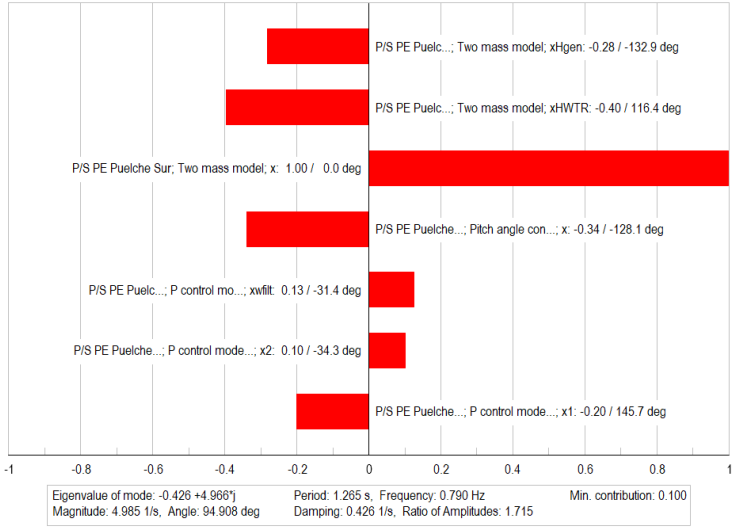


Eigenvalue of mode: -0.367 +9.056*j Period: 0.694 s, Frequency: 1.441 Hz Min. contribution: 0.100
Magnitude: 9.064 1/s, Angle: 92.319 deg Damping: 0.367 1/s, Ratio of Amplitudes: 1.290

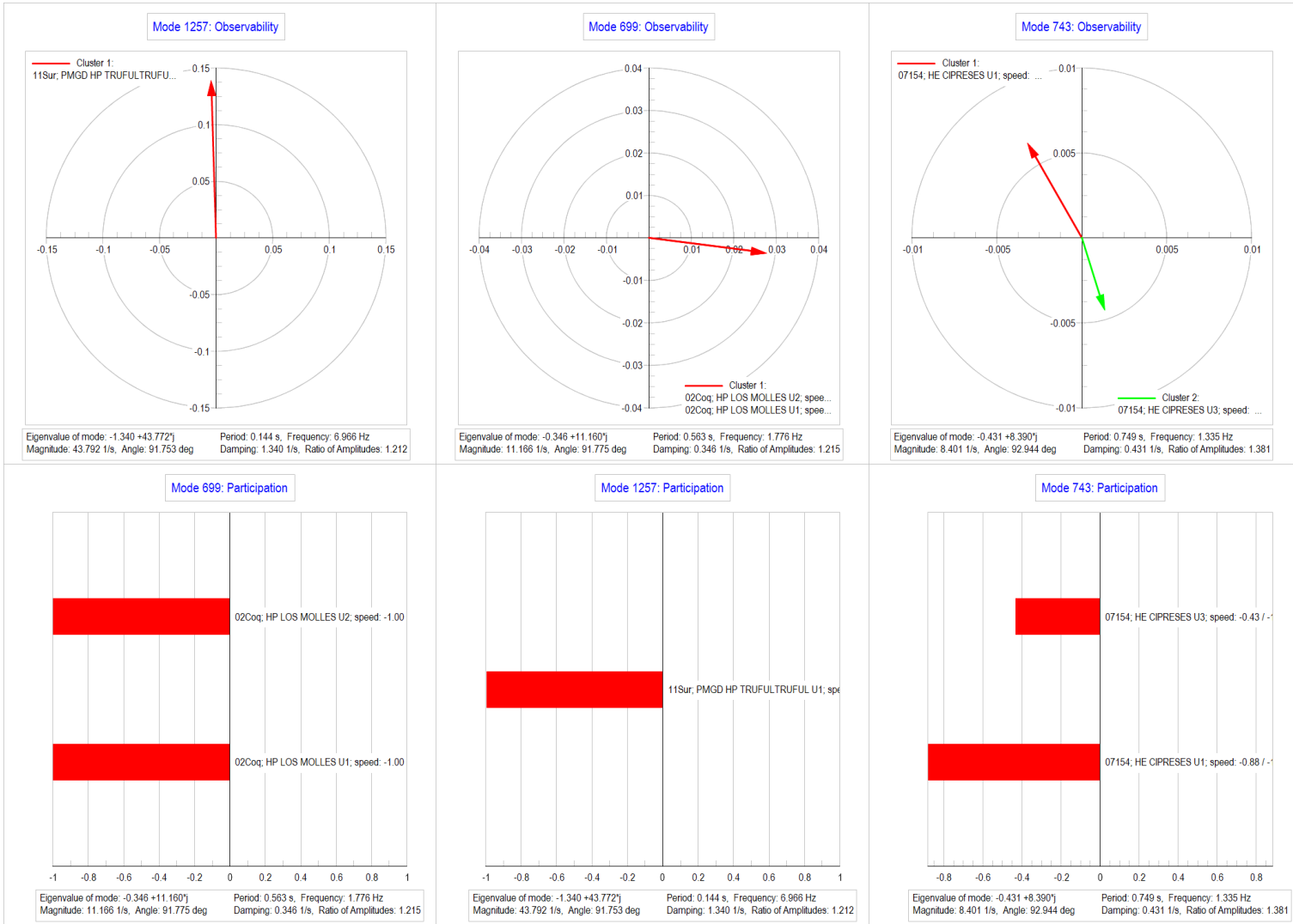

Mode 973: Participation
Planta El Arrayan; PE El Arrayan ...; xt: -0.11 / 176.9 deg
Planta El Arrayan; PE El Arrayan ...; xg: -0.88 / -179.6 deg
Planta El Arrayan; PE El Arrayan D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.695 +12.579*j
Magnitude: 12.598 1/s, Angle: 93.162 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.695 1/s, Ratio of Amplitudes: 1.415
Min. contribution: 0.100


Mode 918: Participation
PE El Totoral ...; Totoral V90 - ...; xt: -0.16 / 176.7 deg
PE El Totoral ...; Totoral V90 - ...; xg: -0.85 / -179.4 deg
PE El Totoral ...; Totoral V90 - D...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.558 +9.752*j
Magnitude: 9.768 1/s, Angle: 93.278 deg
Period: 0.644 s, Frequency: 1.552 Hz
Damping: 0.558 1/s, Ratio of Amplitudes: 1.433
Min. contribution: 0.100


Mode 1034: Participation
Talinay Orient...; TLNY_O_V90 Dr...; xt: -0.11 / 175.7 deg
Talinay Orient...; TLNY_O_V90 Dr...; xg: -0.86 / -179.5 deg
Talinay Orient...; TLNY_O_V90 Dri...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.860 +12.382*j
Magnitude: 12.411 1/s, Angle: 93.975 deg
Period: 0.507 s, Frequency: 1.971 Hz
Damping: 0.860 1/s, Ratio of Amplitudes: 1.547
Min. contribution: 0.100


Mode 736: Participation
P/S PE Puelc...; Two mass model; xHgen: -0.28 / -132.9 deg
P/S PE Puelc...; Two mass model; xHWTR: -0.40 / 116.4 deg
P/S PE Puelche Sur; Two mass model; x: 1.00 / 0.0 deg
P/S PE Puelche...; Pitch angle con...; x: -0.34 / -128.1 deg
P/S PE Puelc...; P control mo...; xwfilt: 0.13 / -31.4 deg
P/S PE Puelche...; P control mode...; x2: 0.10 / -34.3 deg
P/S PE Puelche...; P control mode...; x1: -0.20 / 145.7 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.426 +4.966*j
Magnitude: 4.985 1/s, Angle: 94.908 deg
Period: 1.265 s, Frequency: 0.790 Hz
Damping: 0.426 1/s, Ratio of Amplitudes: 1.715
Min. contribution: 0.100

15.4.2 Red N-1 Caso 1.- Changos Cumbres 500 Kv



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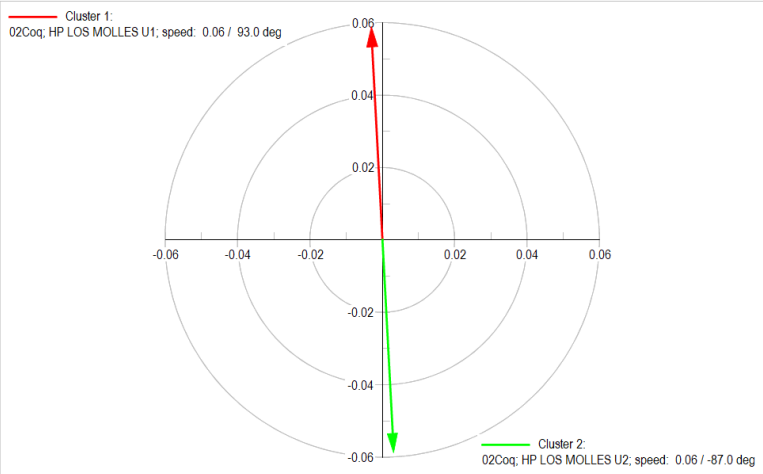
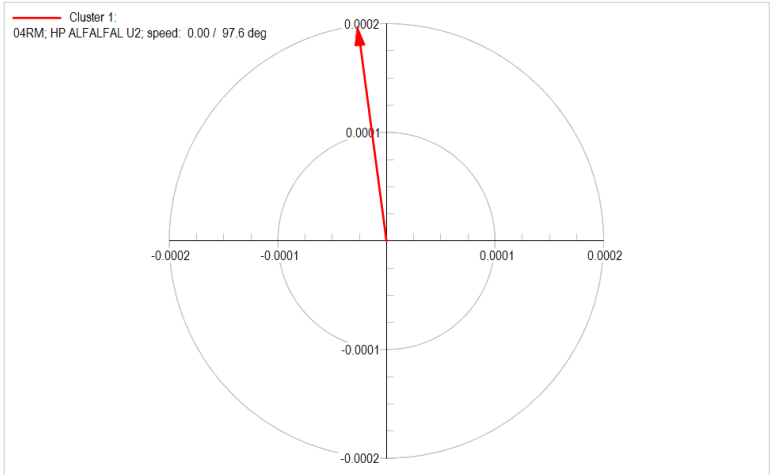
Mode 1078: Observability



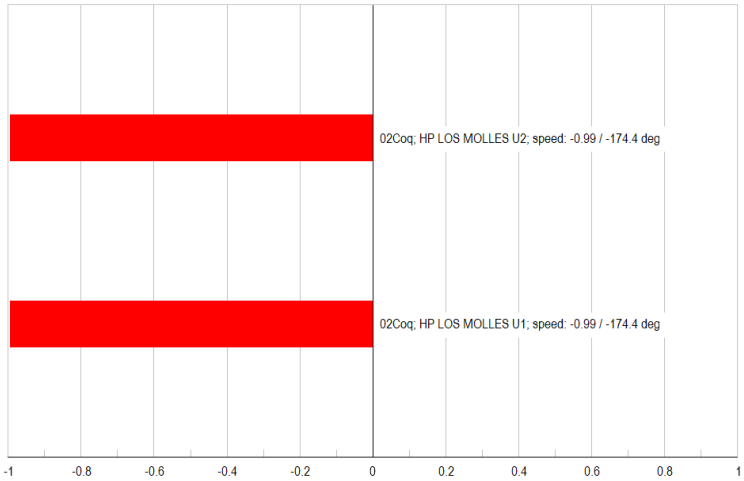
Eigenvalue of mode: -0.973 +18.499*j
Magnitude: 18.525 1/s, Angle: 93.011 deg
Period: 0.340 s, Frequency: 2.944 Hz
Damping: 0.973 1/s, Ratio of Amplitudes: 1.392

Mode 904: Observability



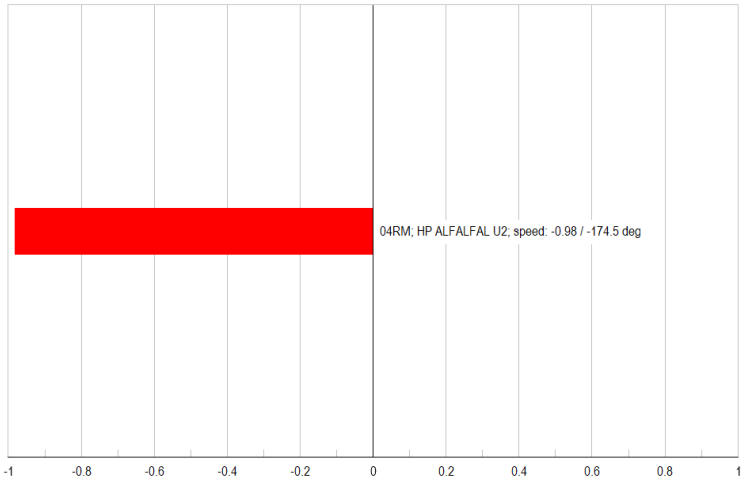
Eigenvalue of mode: -0.544 +9.520*j
Magnitude: 9.535 1/s, Angle: 93.269 deg
Period: 0.660 s, Frequency: 1.515 Hz
Damping: 0.544 1/s, Ratio of Amplitudes: 1.432

Mode 1078: Participation

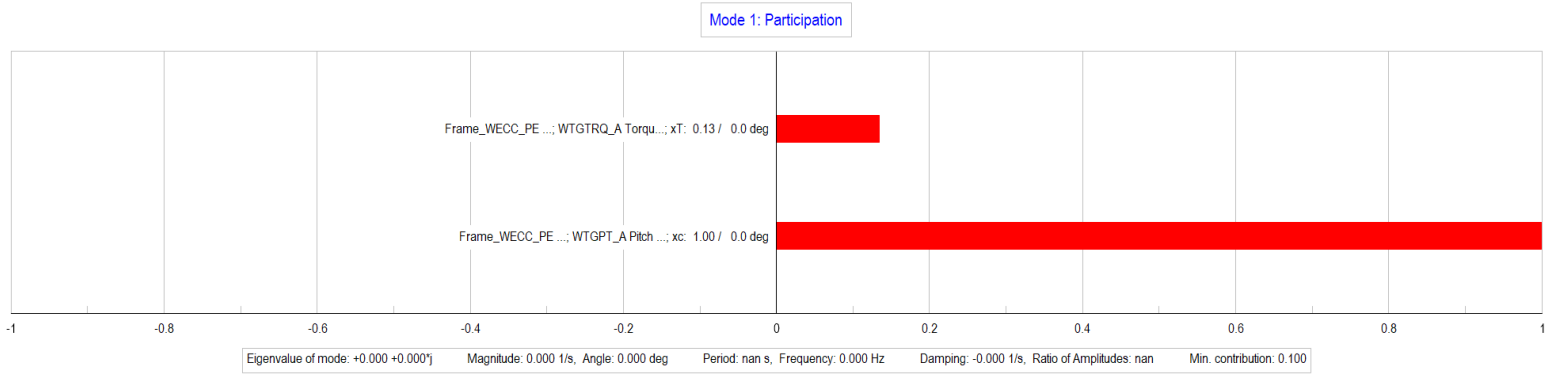


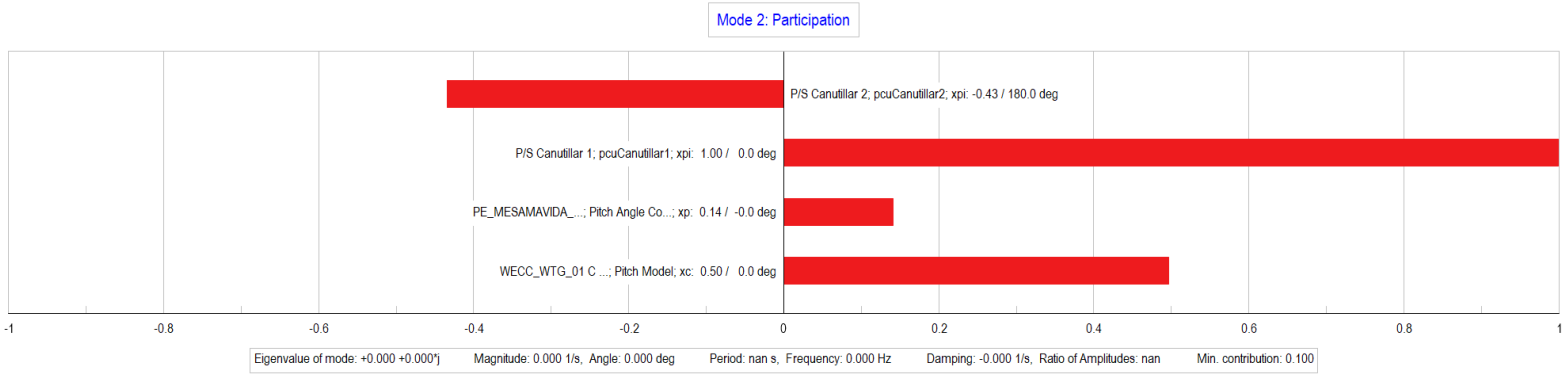
Eigenvalue of mode: -0.973 +18.499*j
Magnitude: 18.525 1/s, Angle: 93.011 deg
Period: 0.340 s, Frequency: 2.944 Hz
Damping: 0.973 1/s, Ratio of Amplitudes: 1.392

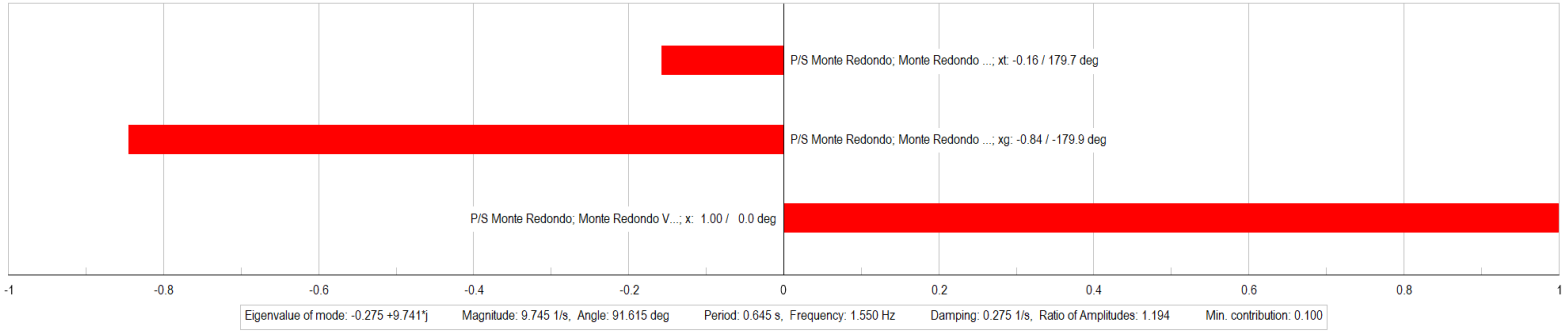
Mode 904: Participation

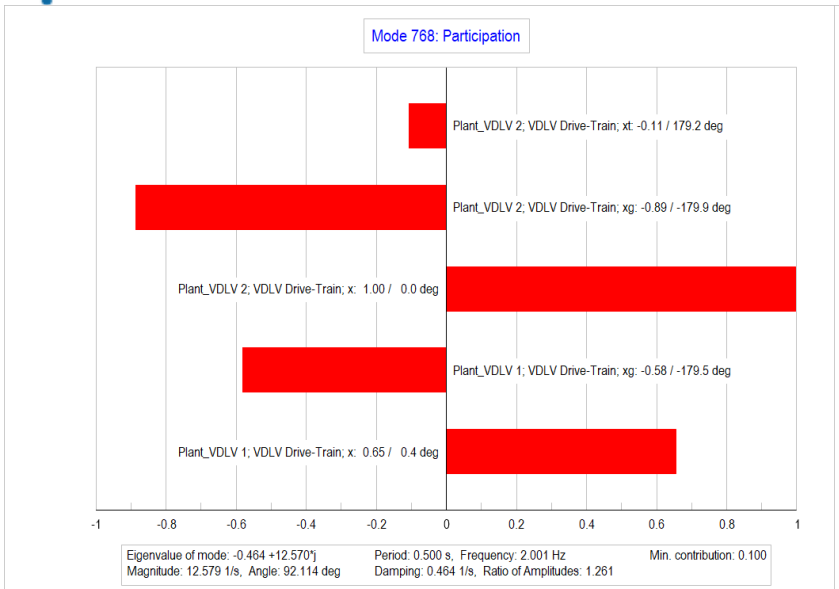


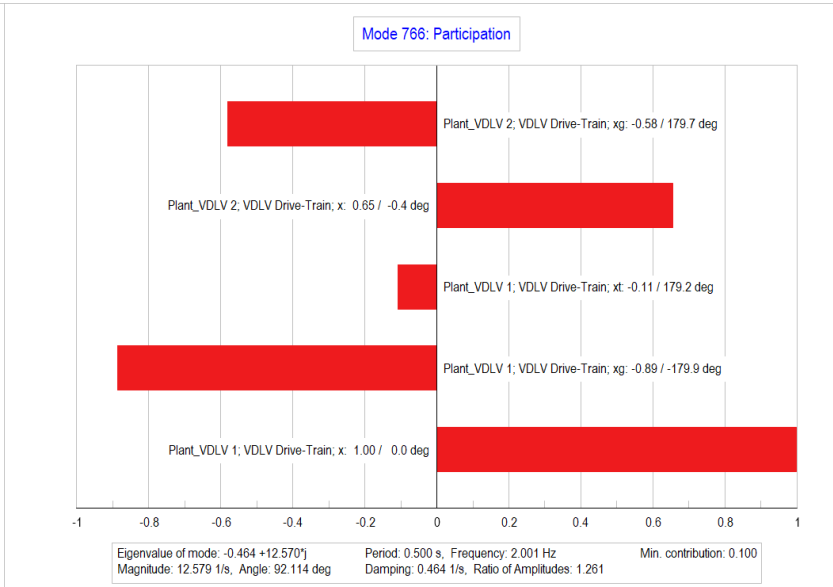
Eigenvalue of mode: -0.544 +9.520*j
Magnitude: 9.535 1/s, Angle: 93.269 deg
Period: 0.660 s, Frequency: 1.515 Hz
Damping: 0.544 1/s, Ratio of Amplitudes: 1.432

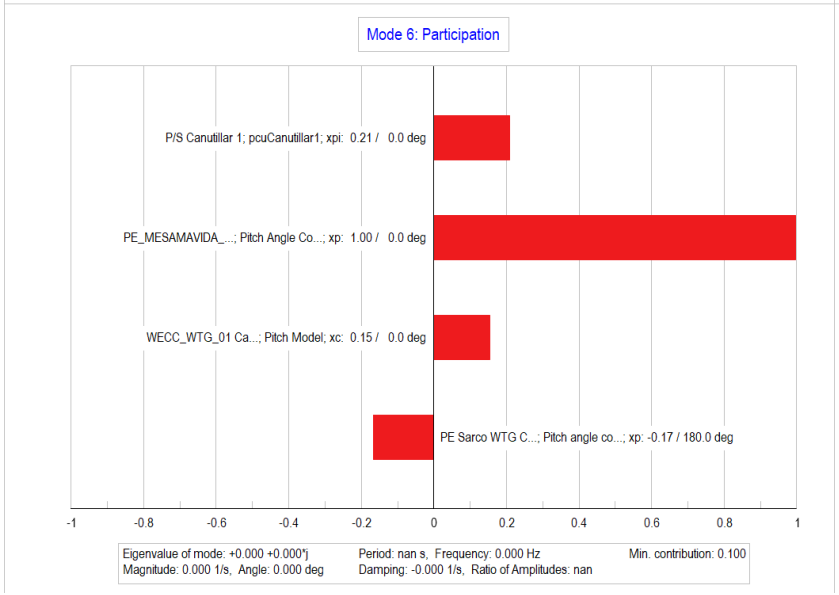

Mode 1: Participation
Frame_WECC_PE ...; WTGTRQ_A Torqu...; xT: 0.13 / 0.0 deg
Frame_WECC_PE ...; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100

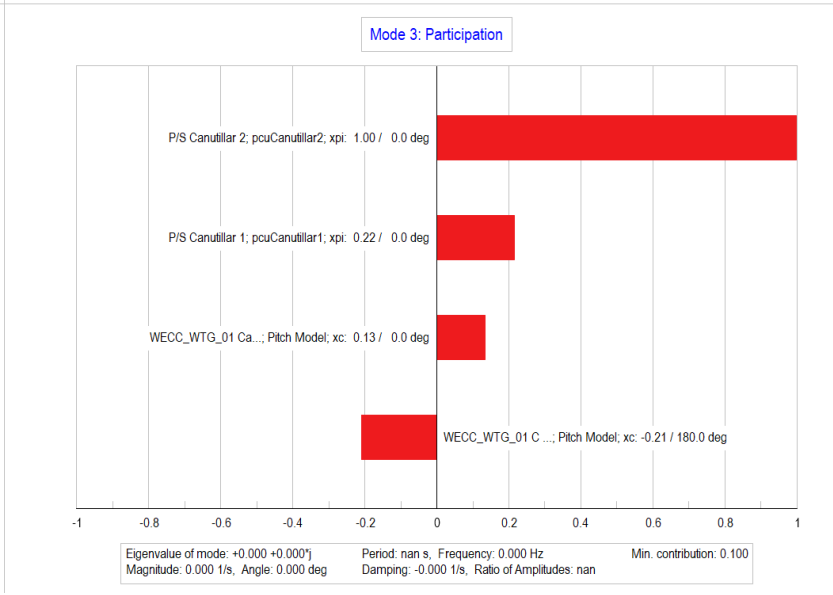

Mode 2: Participation
P/S Canutillar 2; pcuCanutillar2; xpi: -0.43 / 180.0 deg
P/S Canutillar 1; pcuCanutillar1; xpi: 1.00 / 0.0 deg
PE_MESAMAVIDA_...; Pitch Angle Co...; xp: 0.14 / -0.0 deg
WECC_WTG_01 C ...; Pitch Model; xc: 0.50 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100


Mode 659: Participation
P/S Monte Redondo; Monte Redondo ...; xt: -0.16 / 179.7 deg
P/S Monte Redondo; Monte Redondo ...; xg: -0.84 / -179.9 deg
P/S Monte Redondo; Monte Redondo V...; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.275 +9.741*j
Magnitude: 9.745 1/s, Angle: 91.615 deg
Period: 0.645 s, Frequency: 1.550 Hz
Damping: 0.275 1/s, Ratio of Amplitudes: 1.194
Min. contribution: 0.100

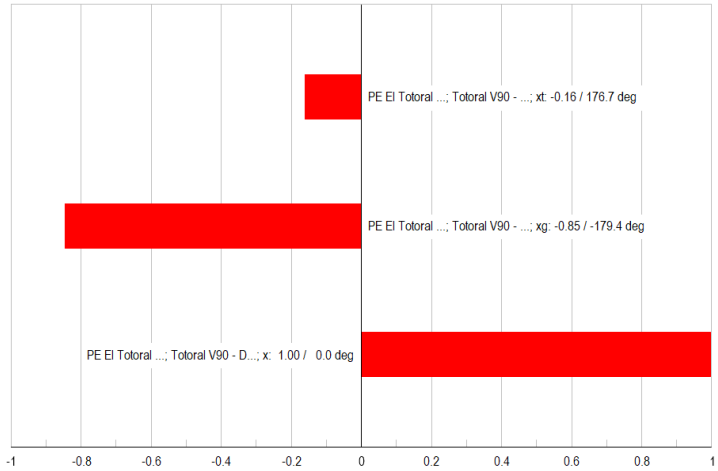

Mode 768: Participation
Plant_VDLV 2; VDLV Drive-Train; xt: -0.11 / 179.2 deg
Plant_VDLV 2; VDLV Drive-Train; xg: -0.89 / -179.9 deg
Plant_VDLV 2; VDLV Drive-Train; x: 1.00 / 0.0 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.58 / -179.5 deg
Plant_VDLV 1; VDLV Drive-Train; x: 0.65 / 0.4 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.464 +12.570*j
Magnitude: 12.579 1/s, Angle: 92.114 deg
Period: 0.500 s, Frequency: 2.001 Hz
Damping: 0.464 1/s, Ratio of Amplitudes: 1.261
Min. contribution: 0.100


Mode 766: Participation
Plant_VDLV 2; VDLV Drive-Train; xg: -0.58 / 179.7 deg
Plant_VDLV 2; VDLV Drive-Train; x: 0.65 / -0.4 deg
Plant_VDLV 1; VDLV Drive-Train; xt: -0.11 / 179.2 deg
Plant_VDLV 1; VDLV Drive-Train; xg: -0.89 / -179.9 deg
Plant_VDLV 1; VDLV Drive-Train; x: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: -0.464 +12.570*j
Magnitude: 12.579 1/s, Angle: 92.114 deg
Period: 0.500 s, Frequency: 2.001 Hz
Damping: 0.464 1/s, Ratio of Amplitudes: 1.261
Min. contribution: 0.100


Mode 6: Participation
P/S Canutillar 1; pcuCanutillar1; xpi: 0.21 / 0.0 deg
PE_MESAMAVIDA_...; Pitch Angle Co...; xp: 1.00 / 0.0 deg
WECC_WTG_01 Ca...; Pitch Model; xc: 0.15 / 0.0 deg
PE Sarco WTG C...; Pitch angle co...; xp: -0.17 / 180.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100

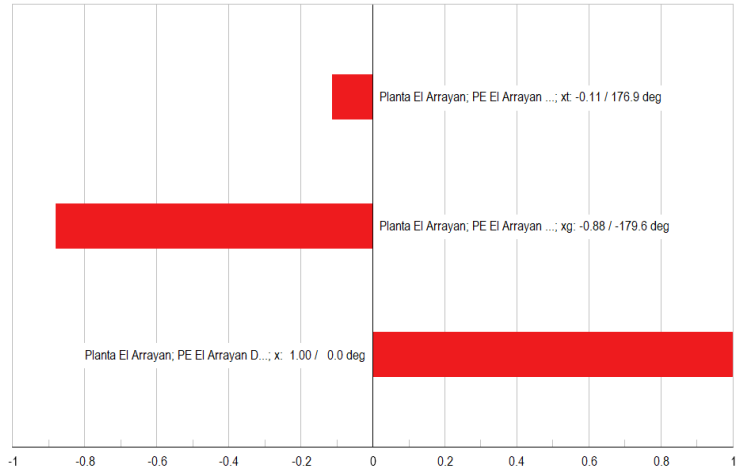

Mode 3: Participation
P/S Canutillar 2; pcuCanutillar2; xpi: 1.00 / 0.0 deg
P/S Canutillar 1; pcuCanutillar1; xpi: 0.22 / 0.0 deg
WECC_WTG_01 Ca...; Pitch Model; xc: 0.13 / 0.0 deg
WECC_WTG_01 C ...; Pitch Model; xc: -0.21 / 180.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100

Mode 916: Participation



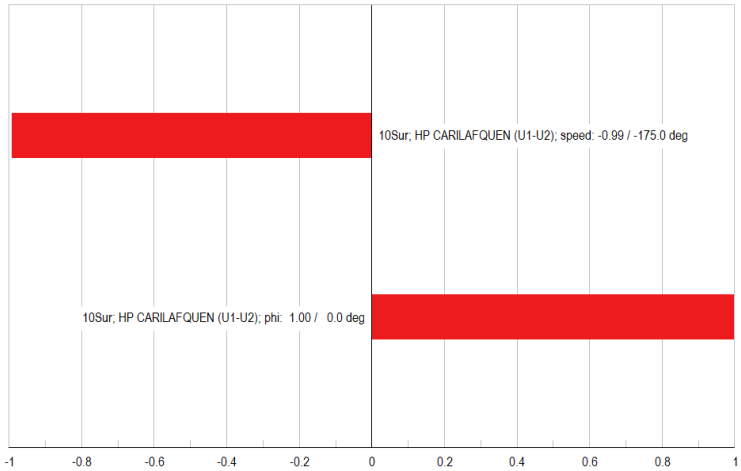
Eigenvalue of mode: -0.558 +9.752*j
Magnitude: 9.768 1/s, Angle: 93.277 deg
Period: 0.644 s, Frequency: 1.552 Hz
Damping: 0.558 1/s, Ratio of Amplitudes: 1.433
Min. contribution: 0.100

Mode 970: Participation



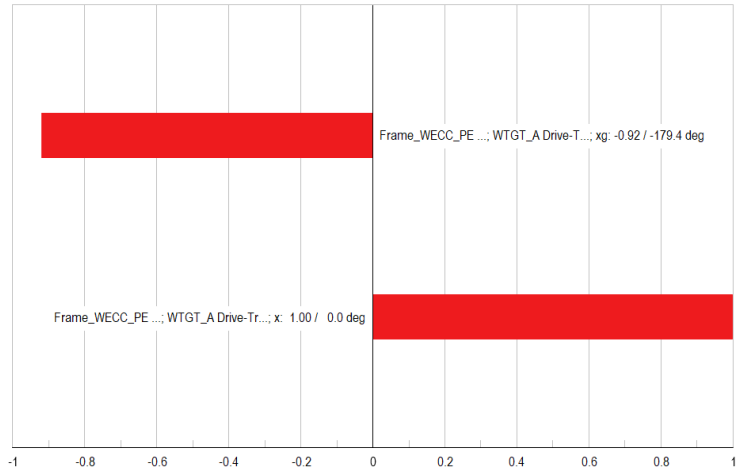
Eigenvalue of mode: -0.695 +12.579*j
Magnitude: 12.598 1/s, Angle: 93.162 deg
Period: 0.499 s, Frequency: 2.002 Hz
Damping: 0.695 1/s, Ratio of Amplitudes: 1.415
Min. contribution: 0.100

Mode 677: Participation



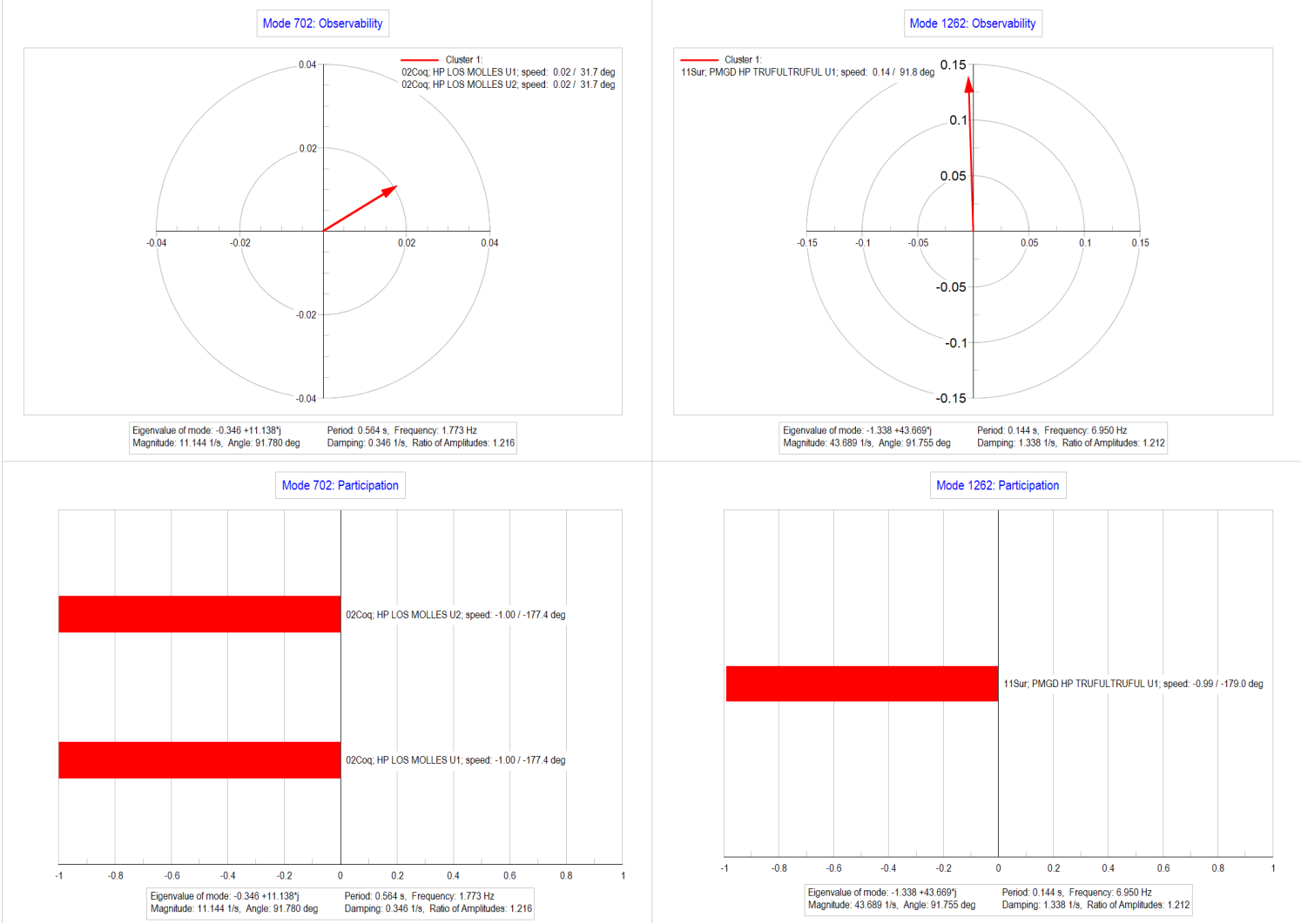
Eigenvalue of mode: -0.312 +5.789*j
Magnitude: 5.797 1/s, Angle: 93.089 deg
Period: 1.085 s, Frequency: 0.921 Hz
Damping: 0.312 1/s, Ratio of Amplitudes: 1.404
Min. contribution: 0.100

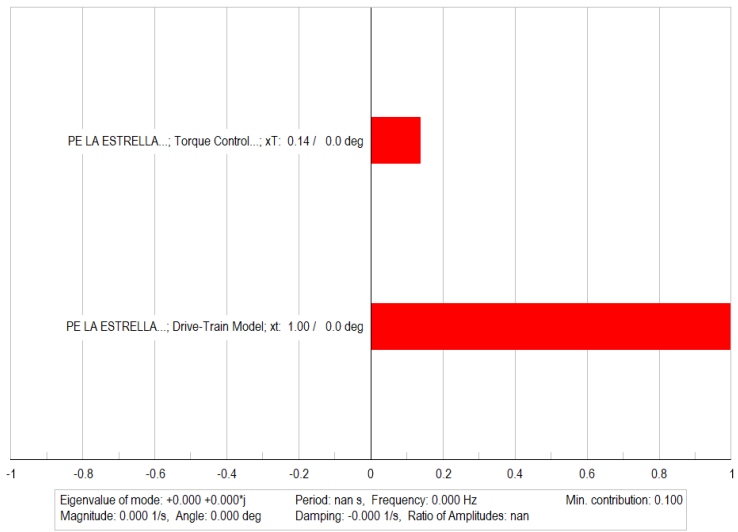
Mode 705: Participation

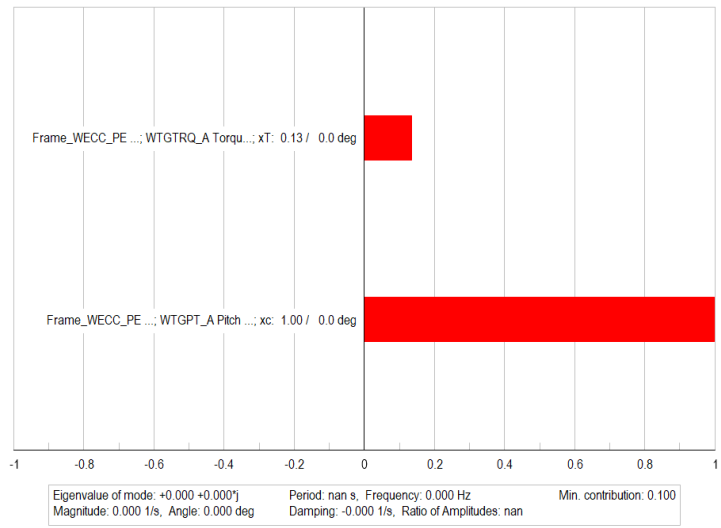


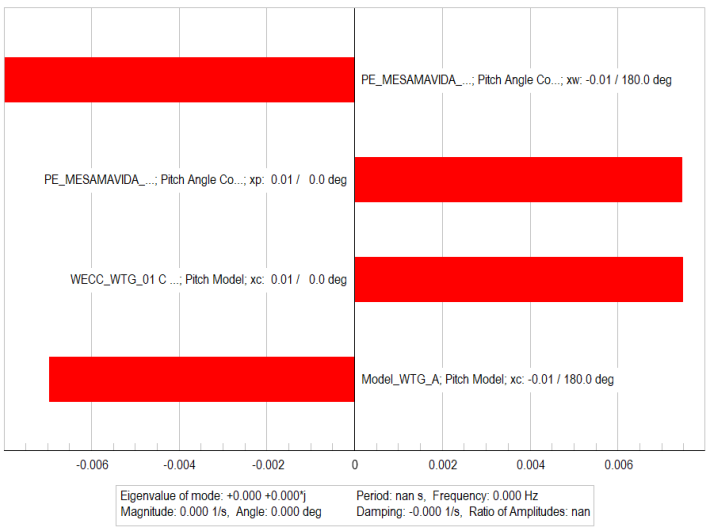
Eigenvalue of mode: -0.367 +9.056*j
Magnitude: 9.064 1/s, Angle: 92.319 deg
Period: 0.694 s, Frequency: 1.441 Hz
Damping: 0.367 1/s, Ratio of Amplitudes: 1.290
Min. contribution: 0.100

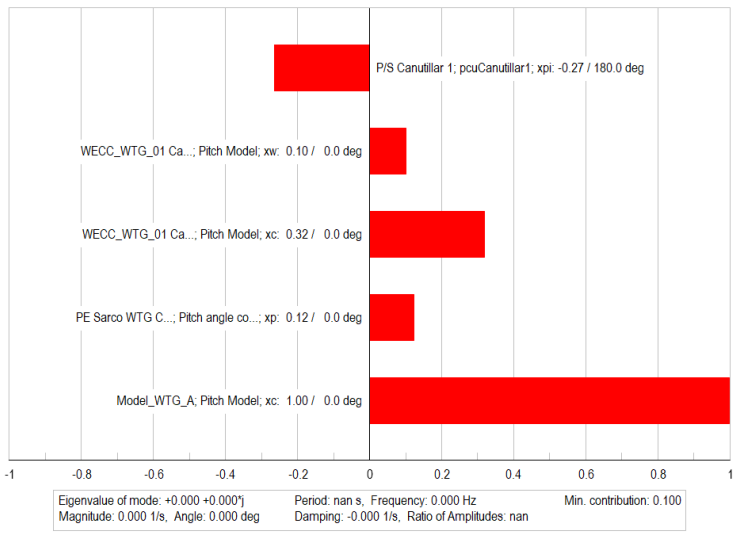
15.4.3 Red N-1 Caso 2.- Nueva Pan de Azúcar - Polpaico 500 kV



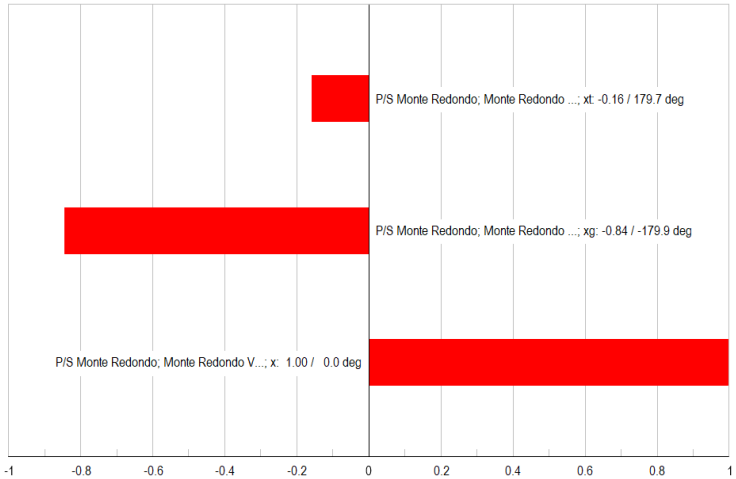

Mode 1: Participation
PE LA ESTRELLA...; Torque Control...; xT: 0.14 / 0.0 deg
PE LA ESTRELLA...; Drive-Train Model; xt: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100


Mode 2: Participation
Frame_WECC_PE ...; WTGTRQ_A Torqu...; xT: 0.13 / 0.0 deg
Frame_WECC_PE ...; WTGPT_A Pitch ...; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100

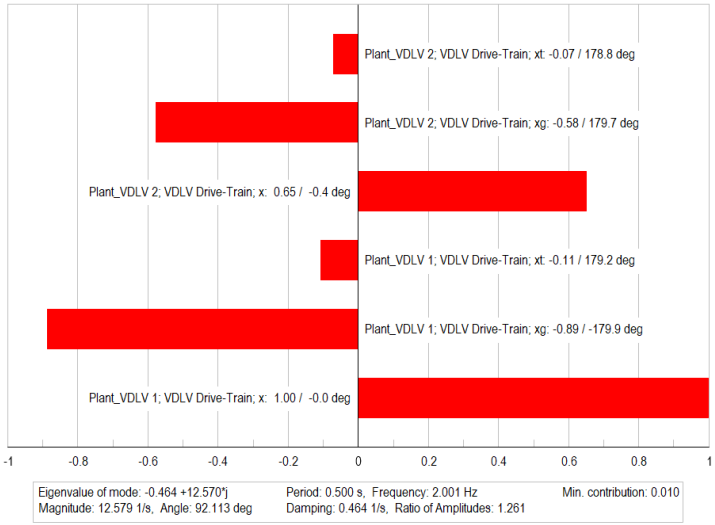

Mode 3: Participation
PE_MESAMAVIDA_...; Pitch Angle Co...; xw: -0.01 / 180.0 deg
PE_MESAMAVIDA_...; Pitch Angle Co...; xp: 0.01 / 0.0 deg
WECC_WTG_01 C ...; Pitch Model; xc: 0.01 / 0.0 deg
Model_WTG_A; Pitch Model; xc: -0.01 / 180.0 deg
-0.006 -0.004 -0.002 0 0.002 0.004 0.006
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan


Mode 6: Participation
P/S Canutillar 1; pcuCanutillar1; xpi: -0.27 / 180.0 deg
WECC_WTG_01 Ca...; Pitch Model; xw: 0.10 / 0.0 deg
WECC_WTG_01 Ca...; Pitch Model; xc: 0.32 / 0.0 deg
PE Sarco WTG C...; Pitch angle co...; xp: 0.12 / 0.0 deg
Model_WTG_A; Pitch Model; xc: 1.00 / 0.0 deg
-1 -0.8 -0.6 -0.4 -0.2 0 0.2 0.4 0.6 0.8 1
Eigenvalue of mode: +0.000 +0.000*j
Magnitude: 0.000 1/s, Angle: 0.000 deg
Period: nan s, Frequency: 0.000 Hz
Damping: -0.000 1/s, Ratio of Amplitudes: nan
Min. contribution: 0.100

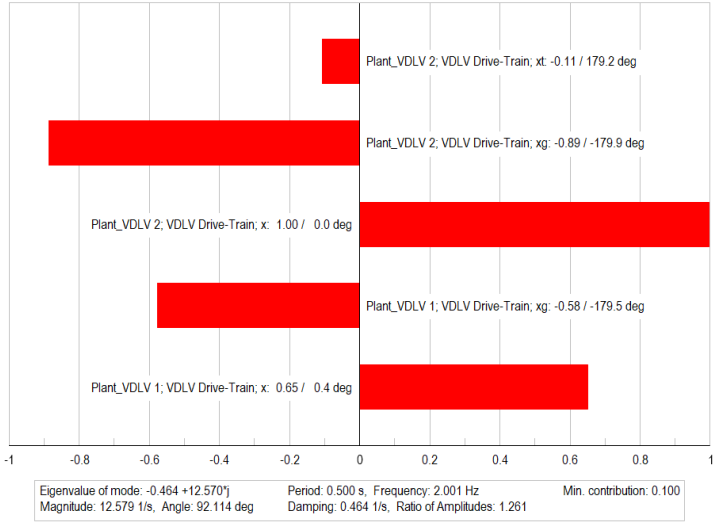
Mode 662: Participation



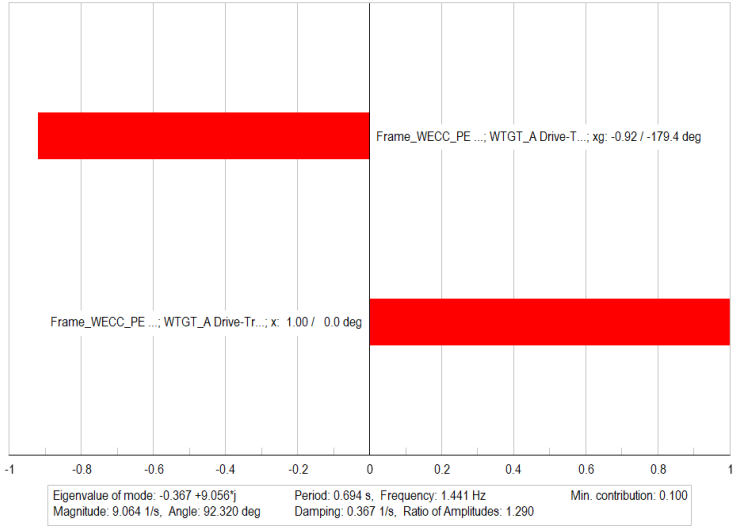
Mode 768: Participation



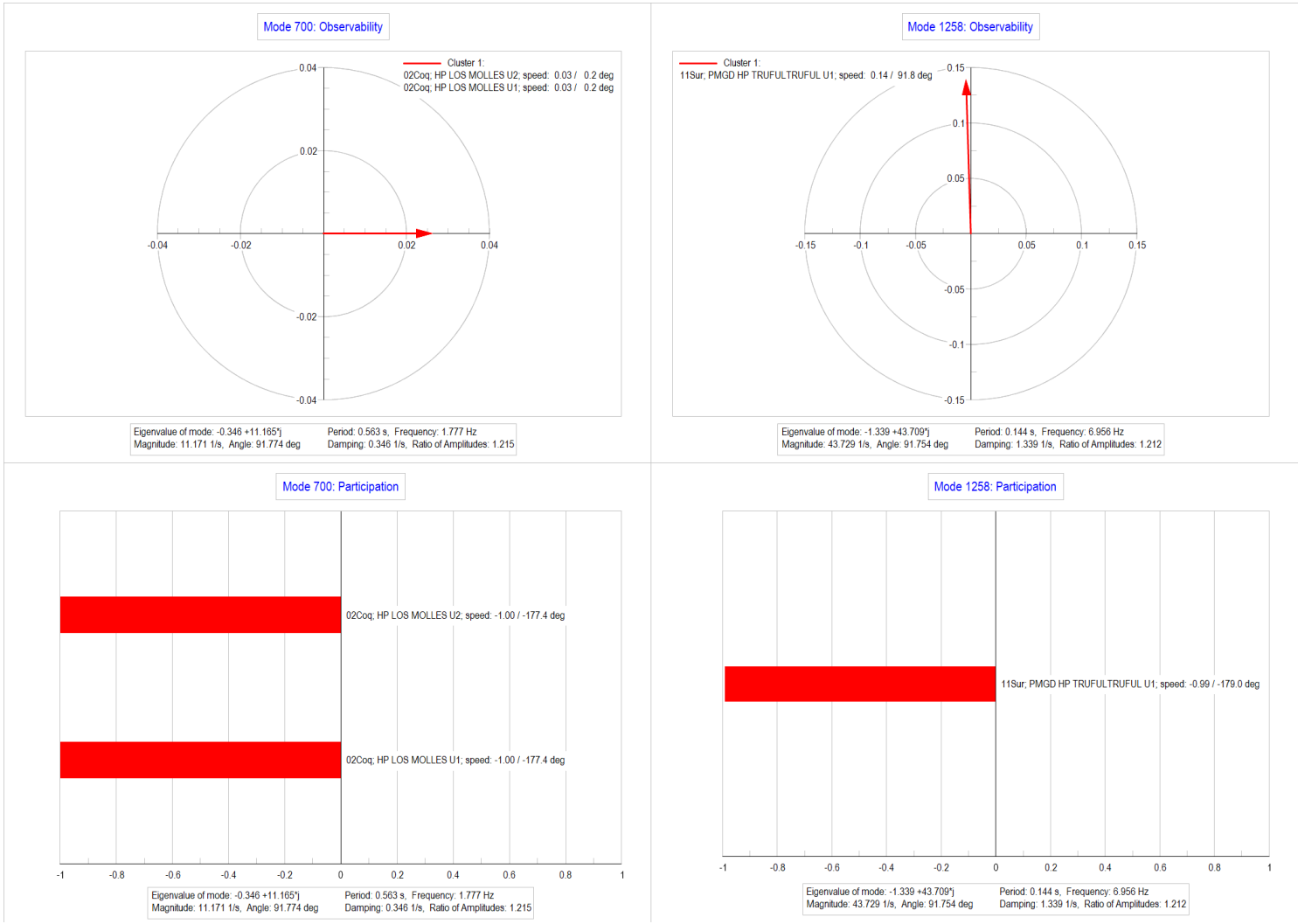
Mode 770: Participation



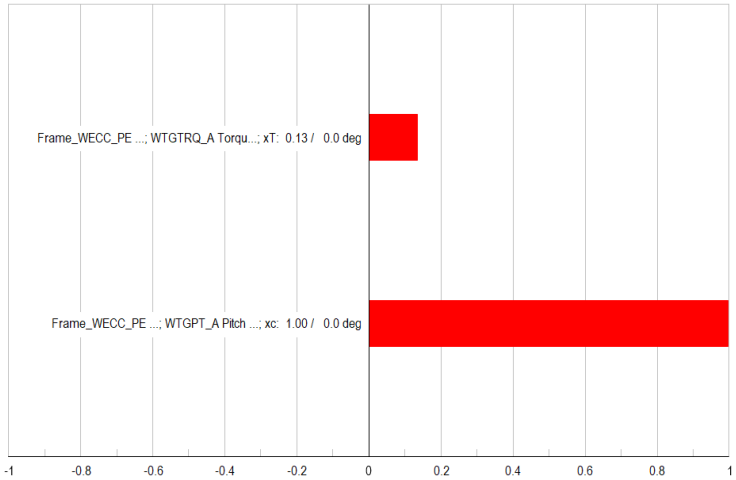
Mode 707: Participation



15.4.4 Red N-1 Caso 3.- Entre Ríos - Ancoa 500 kV

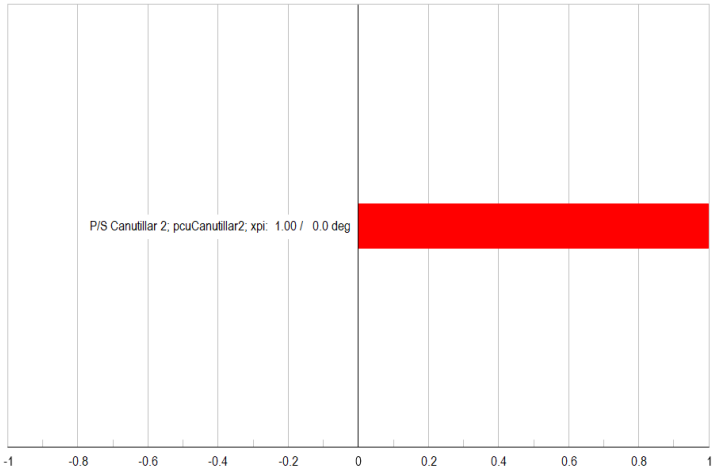


Mode 1: Participation



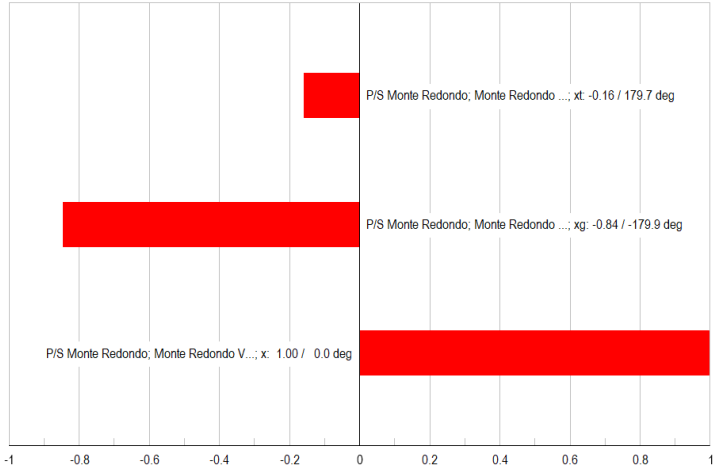
Eigenvalue of mode: +0.000 +0.000*j Period: nan s, Frequency: 0.000 Hz Min. contribution: 0.100
Magnitude: 0.000 1/s, Angle: 0.000 deg Damping: -0.000 1/s, Ratio of Amplitudes: nan

Mode 2: Participation



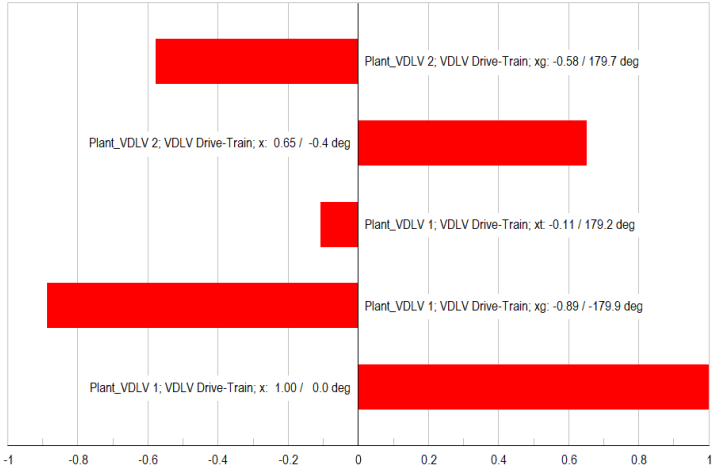
Eigenvalue of mode: +0.000 +0.000*j Period: nan s, Frequency: 0.000 Hz Min. contribution: 0.100
Magnitude: 0.000 1/s, Angle: 0.000 deg Damping: -0.000 1/s, Ratio of Amplitudes: nan

Mode 661: Participation



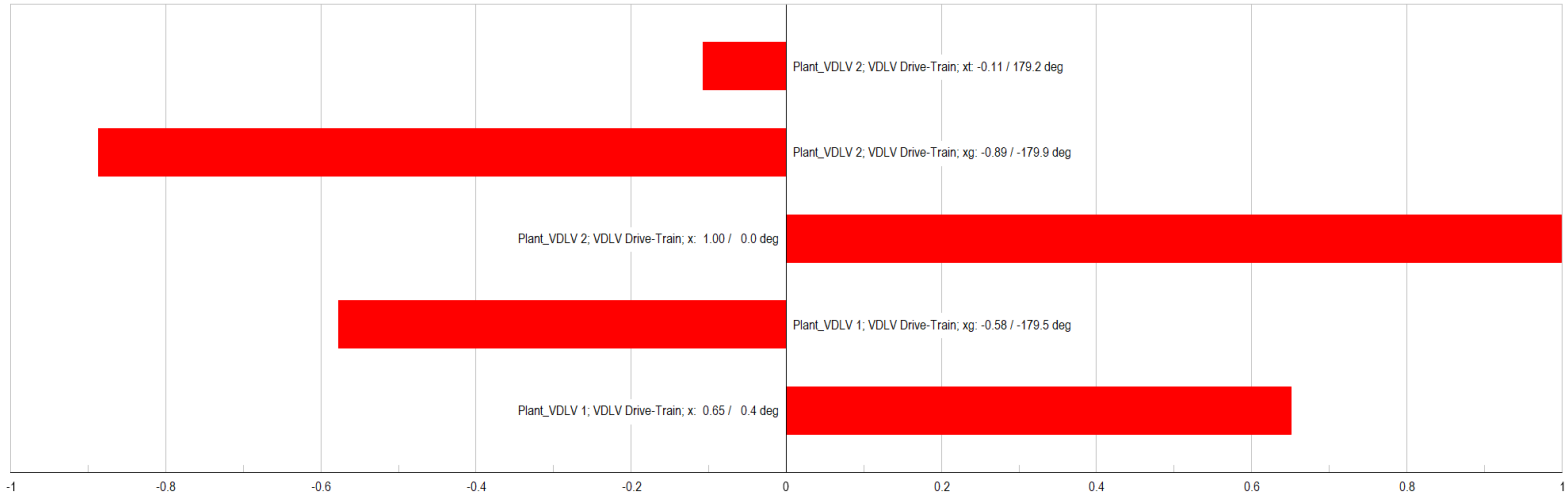
Eigenvalue of mode: -0.275 +9.741*j Period: 0.645 s, Frequency: 1.550 Hz Min. contribution: 0.100
Magnitude: 9.745 1/s, Angle: 91.615 deg Damping: 0.275 1/s, Ratio of Amplitudes: 1.194

Mode 769: Participation



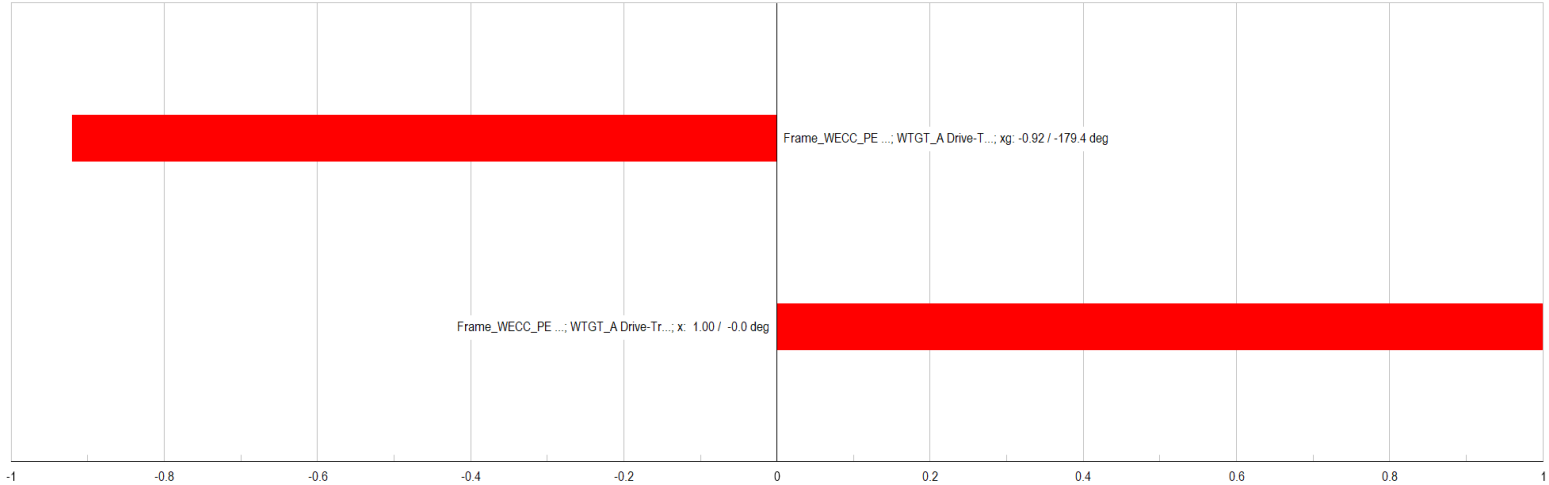
Eigenvalue of mode: -0.464 +12.570*j Period: 0.500 s, Frequency: 2.001 Hz Min. contribution: 0.100
Magnitude: 12.579 1/s, Angle: 92.114 deg Damping: 0.464 1/s, Ratio of Amplitudes: 1.261

Mode 771: Participation



Eigenvalue of mode: -0.464 +12.570*j Magnitude: 12.579 1/s, Angle: 92.114 deg Period: 0.500 s, Frequency: 2.001 Hz Damping: 0.464 1/s, Ratio of Amplitudes: 1.261 Min. contribution: 0.100

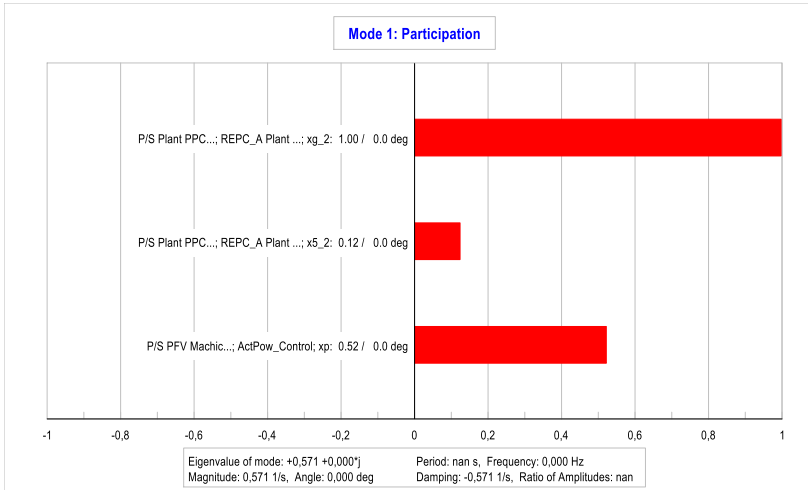
Mode 706: Participation

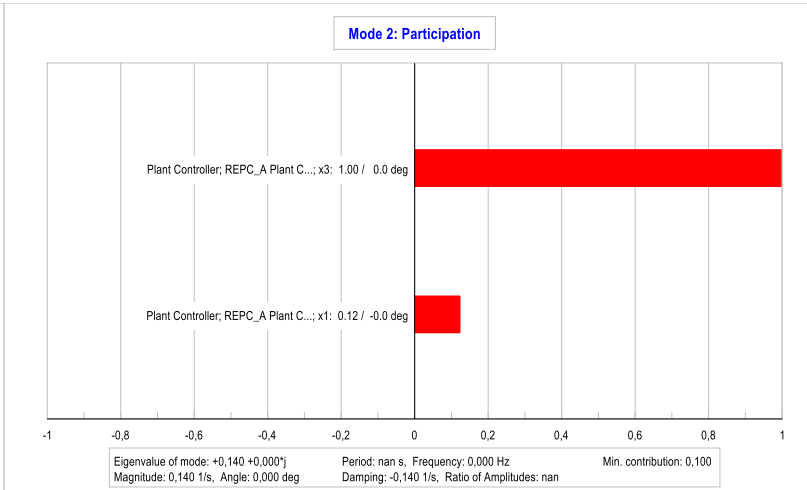


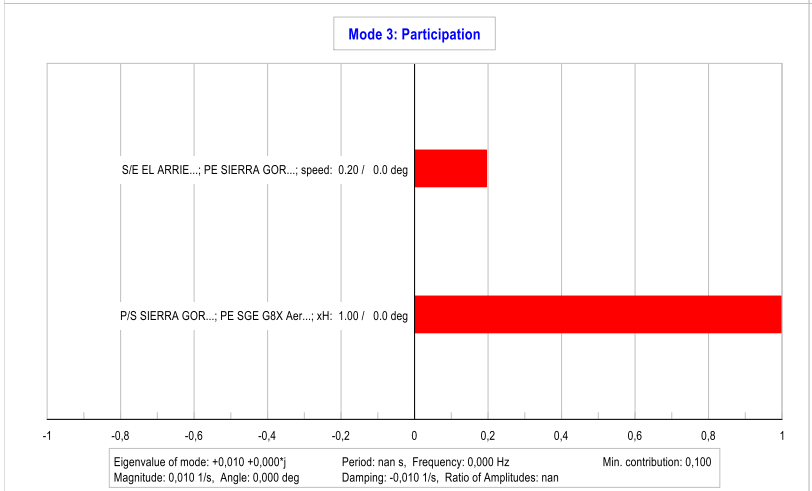
Eigenvalue of mode: -0.367 +9.056*j Magnitude: 9.064 1/s, Angle: 92.319 deg Period: 0.694 s, Frequency: 1.441 Hz Damping: 0.367 1/s, Ratio of Amplitudes: 1.290 Min. contribution: 0.100

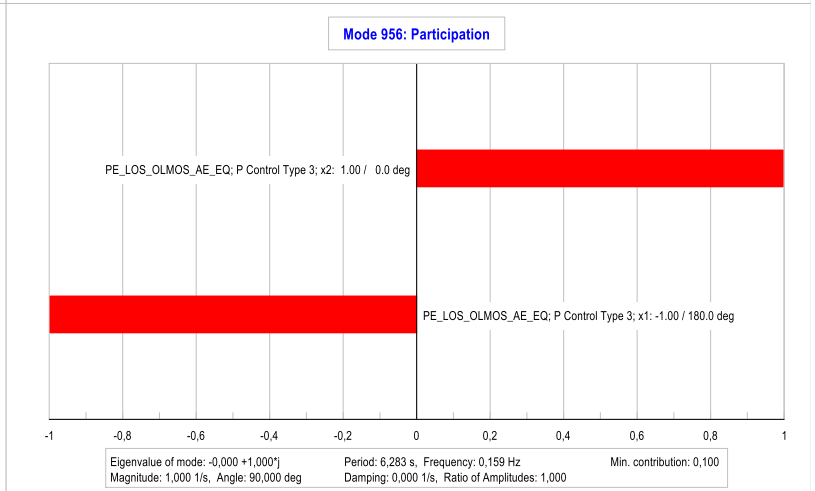
16 MODOS INESTABLES

16.1 Escenario E1

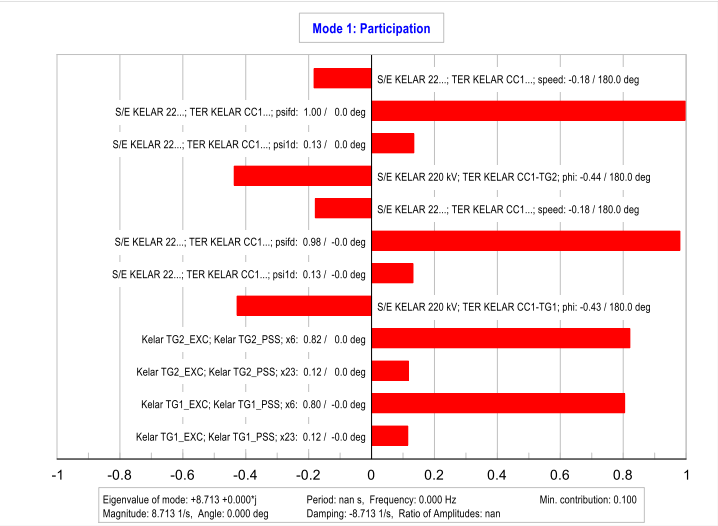


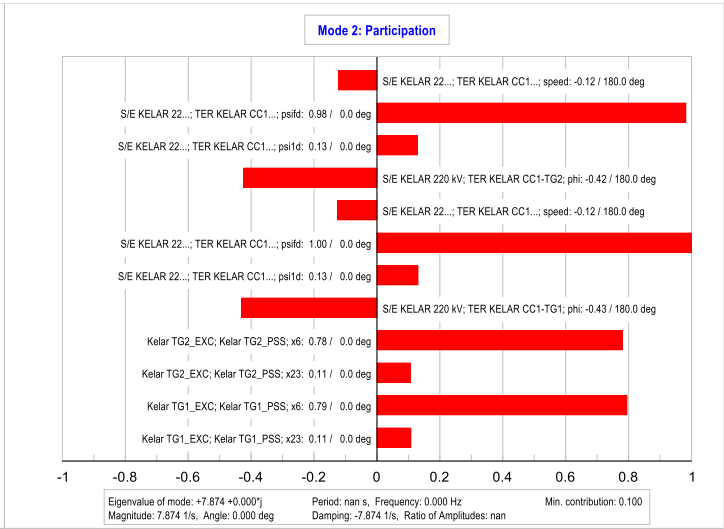


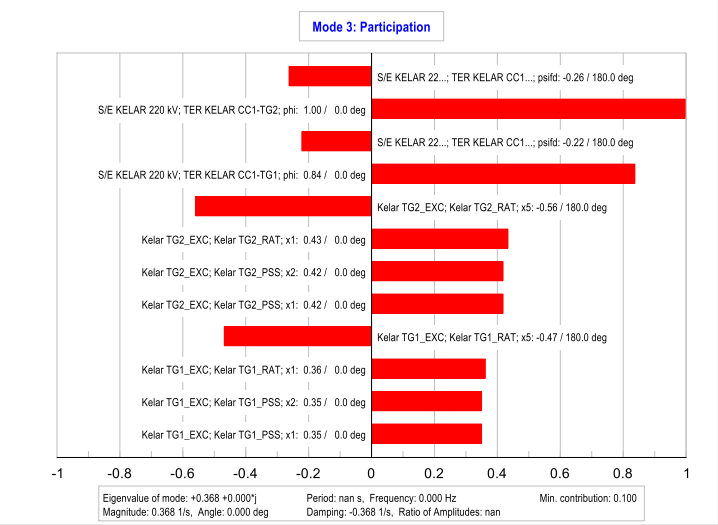


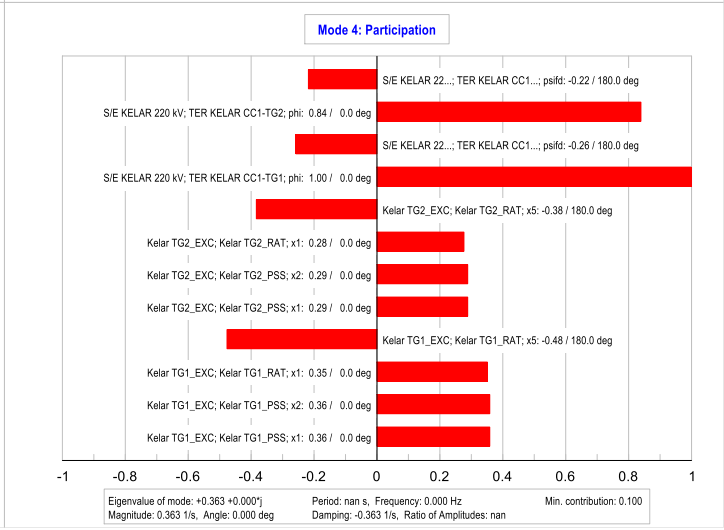


16.2 Escenario E2









16.3 Escenario E3