Detected Resonant Frequencies (0-200 Hz):
16
44
52
88
176
190

Estimated Damping Ratios:
Mode near 16.00 Hz → ζ = 0.1250
Mode near 44.00 Hz → ζ = 0.0455
Mode near 52.00 Hz → ζ = 0.0385
Mode near 88.00 Hz → ζ = 0.0341
Mode near 176.00 Hz → ζ = 0.0284
Mode near 190.00 Hz → ζ = 0.0263

Normalized Mode Shapes (0-200 Hz):

Mode at 16.00 Hz:
X: 0.750∠174.5°
Y: 0.234∠-177.7°
Z: 1.000∠-5.4°

Mode at 44.00 Hz:
X: 1.000∠-7.6°
Y: 0.551∠-85.3°
Z: 0.897∠174.1°

Mode at 52.00 Hz:
X: 1.000∠-115.4°
Y: 0.068∠71.2°
Z: 0.795∠66.2°

Mode at 88.00 Hz:
X: 0.254∠-175.7°
Y: 1.000∠145.3°
Z: 0.176∠12.9°

Mode at 176.00 Hz:

X: 0.201∠-159.3°
Y: 1.000∠136.7°
Z: 0.168∠169.6°

Mode at 190.00 Hz:
X: 0.574∠-141.7°
Y: 0.475∠57.6°
Z: 1.000∠51.5°
=== Modal Parameter Summary (0-200 Hz) ===
Freq_Hz Damping Phi_X Phi_Y Phi_Z
——— ——— ——————— ——————— ———————

16 0.125 -0.74618+0.072004i -0.23356-0.009204i 0.9956-0.093658i
44 0.045455 0.99117-0.13262i 0.045264-0.54936i -0.892+0.092867i
52 0.038462 -0.42953-0.90305i 0.021824+0.064194i 0.32008+0.7272i
88 0.034091 -0.25376-0.019038i -0.82253+0.56873i 0.17136+0.039128i
176 0.028409 -0.18815-0.07101i -0.72721+0.68642i -0.16514+0.030209i
190 0.026316 -0.4502-0.35542i 0.25414+0.40118i 0.62262+0.78253i

Detected Resonant Frequencies (0-200 Hz):
16
44
52
88
176
190

Estimated Damping Ratios:
0.1250
0.0455
0.0385
0.0341
0.0284
0.0263

=== Modal Summary (0-200 Hz) ===
Mode 1: f=16.00 Hz, Damping=0.1250, k_dyn_X=1400318.13 N/m, k_dyn_Y=4491036.04 N/m, k_dyn_Z=1049742.83 N/m

Mode Shape (X,Y,Z): 0.750∠174.5°, 0.234∠-177.7°, 1.000∠-5.4°
Mode 2: f=44.00 Hz, Damping=0.0455, k_dyn_X=26083589.57 N/m, k_dyn_Y=47319624.35 N/m, k_dyn_Z=29084391.48 N/m
Mode Shape (X,Y,Z): 1.000∠-7.6°, 0.551∠-85.3°, 0.897∠174.1°
Mode 3: f=52.00 Hz, Damping=0.0385, k_dyn_X=6521094.45 N/m, k_dyn_Y=96177777.55 N/m, k_dyn_Z=8207496.63 N/m
Mode Shape (X,Y,Z): 1.000∠-115.4°, 0.068∠71.2°, 0.795∠66.2°
Mode 4: f=88.00 Hz, Damping=0.0341, k_dyn_X=177070025.15 N/m, k_dyn_Y=45060333.28 N/m, k_dyn_Z=256355651.13 N/m
Mode Shape (X,Y,Z): 0.254∠-175.7°, 1.000∠145.3°, 0.176∠12.9°
Mode 5: f=176.00 Hz, Damping=0.0284, k_dyn_X=533551100.58 N/m, k_dyn_Y=107297084.92 N/m, k_dyn_Z=639136796.47 N/m
Mode Shape (X,Y,Z): 0.201∠-159.3°, 1.000∠136.7°, 0.168∠169.6°
Mode 6: f=190.00 Hz, Damping=0.0263, k_dyn_X=361927460.80 N/m, k_dyn_Y=437136515.47 N/m, k_dyn_Z=207598713.02 N/m
Mode Shape (X,Y,Z): 0.574∠-141.7°, 0.475∠57.6°, 1.000∠51.5°