Detected Resonant Frequencies (0-200 Hz):
16
52
88
122
146
186

Estimated Damping Ratios:
Mode near 16.00 Hz → ζ = 0.1250
Mode near 52.00 Hz → ζ = 0.0577
Mode near 88.00 Hz → ζ = 0.0341
Mode near 122.00 Hz → ζ = 0.0410
Mode near 146.00 Hz → ζ = 0.0274
Mode near 186.00 Hz → ζ = 0.0430

Normalized Mode Shapes (0-200 Hz):

Mode at 16.00 Hz:
X: 0.019∠157.6°
Y: 0.021∠123.1°
Z: 1.000∠167.5°

Mode at 52.00 Hz:
X: 1.000∠66.8°
Y: 0.127∠-89.2°
Z: 0.793∠-18.1°

Mode at 88.00 Hz:
X: 0.104∠-57.6°
Y: 1.000∠-34.0°
Z: 0.487∠8.3°

Mode at 122.00 Hz:
X: 0.069∠77.3°
Y: 0.049∠64.3°
Z: 1.000∠76.9°

Mode at 146.00 Hz:
X: 0.065∠-51.1°
Y: 0.223∠-63.6°
Z: 1.000∠23.4°

Mode at 186.00 Hz:
X: 0.163∠-100.3°
Y: 0.178∠150.3°
Z: 1.000∠17.1°
=== Modal Parameter Summary (0-200 Hz) ===
Freq_Hz Damping Phi_X Phi_Y Phi_Z
——— ——— ——————————— ——————————— ———————————

16 0.125 -0.017442+0.0071816i -0.011378+0.017451i -0.97626+0.21659i
52 0.057692 0.39422+0.91902i 0.0017201-0.12723i 0.75322-0.24661i
88 0.034091 0.055757-0.088008i 0.82882-0.55952i 0.48212+0.070327i
122 0.040984 0.015181+0.06761i 0.021437+0.044454i 0.22603+0.97412i
146 0.027397 0.040688-0.050431i 0.099189-0.20024i 0.91746+0.39783i
186 0.043011 -0.029251-0.16039i -0.15504+0.088448i 0.95556+0.29478i

Detected Resonant Frequencies (0-200 Hz):
16
52
88
122
146
186

Estimated Damping Ratios:
0.1250
0.0577
0.0341
0.0410
0.0274
0.0430

=== Modal Summary (0-200 Hz) ===
Mode 1: f=16.00 Hz, Damping=0.1250, k_dyn_X=8195776.87 N/m, k_dyn_Y=7420866.90 N/m, k_dyn_Z=154592.23 N/m
Mode Shape (X,Y,Z): 0.019∠157.6°, 0.021∠123.1°, 1.000∠167.5°
Mode 2: f=52.00 Hz, Damping=0.0577, k_dyn_X=14996983.56 N/m, k_dyn_Y=117861128.37 N/m, k_dyn_Z=18922173.59 N/m
Mode Shape (X,Y,Z): 1.000∠66.8°, 0.127∠-89.2°, 0.793∠-18.1°
Mode 3: f=88.00 Hz, Damping=0.0341, k_dyn_X=502580997.69 N/m, k_dyn_Y=52360875.03 N/m, k_dyn_Z=107467134.75 N/m
Mode Shape (X,Y,Z): 0.104∠-57.6°, 1.000∠-34.0°, 0.487∠8.3°
Mode 4: f=122.00 Hz, Damping=0.0410, k_dyn_X=65415541.11 N/m, k_dyn_Y=91847118.55 N/m, k_dyn_Z=4532882.38 N/m
Mode Shape (X,Y,Z): 0.069∠77.3°, 0.049∠64.3°, 1.000∠76.9°
Mode 5: f=146.00 Hz, Damping=0.0274, k_dyn_X=488433312.77 N/m, k_dyn_Y=141635283.96 N/m, k_dyn_Z=31649475.98 N/m
Mode Shape (X,Y,Z): 0.065∠-51.1°, 0.223∠-63.6°, 1.000∠23.4°
Mode 6: f=186.00 Hz, Damping=0.0430, k_dyn_X=664947086.06 N/m, k_dyn_Y=607366525.46 N/m, k_dyn_Z=108411531.67 N/m
Mode Shape (X,Y,Z): 0.163∠-100.3°, 0.178∠150.3°, 1.000∠17.1°