Detected Resonant Frequencies (0-200 Hz):
88
124
148
188

Estimated Damping Ratios:
Mode near 88.00 Hz → ζ = 0.0341
Mode near 124.00 Hz → ζ = 0.0484
Mode near 148.00 Hz → ζ = 0.0270
Mode near 188.00 Hz → ζ = 0.0426

Normalized Mode Shapes (0-200 Hz):

Mode at 88.00 Hz:
X: 0.049∠-179.7°
Y: 1.000∠166.3°
Z: 0.133∠-160.6°

Mode at 124.00 Hz:
X: 0.042∠-138.0°
Y: 0.173∠47.9°
Z: 1.000∠-130.3°

Mode at 148.00 Hz:
X: 0.052∠125.1°
Y: 1.000∠-85.8°
Z: 0.702∠-160.4°

Mode at 188.00 Hz:
X: 0.132∠-164.8°
Y: 0.601∠115.5°
Z: 1.000∠134.1°

=== Modal Parameter Summary (0-200 Hz) ===

Freq_Hz	Damping	Phi_X	Phi_Y	Phi_Z

88	0.034091	-0.049112-0.00027348i	-0.97151+0.23701i	-0.12555-0.04429i
124	0.048387	-0.031123-0.028012i	0.11569+0.12819i	-0.64736-0.76218i
148	0.027027	-0.030044+0.042816i	0.072582-0.99736i	-0.66121-0.23554i
188	0.042553	-0.12734-0.034604i	-0.25867+0.54275i	-0.69614+0.71791i

Detected Resonant Frequencies (0-200 Hz):

88
124
148
188

Estimated Damping Ratios:

0.0341
0.0484
0.0270
0.0426

=== Modal Summary (0-200 Hz) ===
Mode 1: f=88.00 Hz, Damping=0.0341, k_dyn_X=456104183.12 N/m, k_dyn_Y=22400484.23 N/m, k_dyn_Z=168257316.38 N/m
  Mode Shape (X,Y,Z): 0.049∠-179.7°, 1.000∠166.3°, 0.133∠-160.6°
Mode 2: f=124.00 Hz, Damping=0.0484, k_dyn_X=195584834.80 N/m, k_dyn_Y=47428856.10 N/m, k_dyn_Z=8189590.91 N/m
  Mode Shape (X,Y,Z): 0.042∠-138.0°, 0.173∠47.9°, 1.000∠-130.3°
Mode 3: f=148.00 Hz, Damping=0.0270, k_dyn_X=720585845.50 N/m, k_dyn_Y=37690462.32 N/m, k_dyn_Z=53697138.96 N/m
  Mode Shape (X,Y,Z): 0.052∠125.1°, 1.000∠-85.8°, 0.702∠-160.4°
Mode 4: f=188.00 Hz, Damping=0.0426, k_dyn_X=740275687.21 N/m, k_dyn_Y=162474824.32 N/m, k_dyn_Z=97685528.86 N/m
  Mode Shape (X,Y,Z): 0.132∠-164.8°, 0.601∠115.5°, 1.000∠134.1°