Detected Resonant Frequencies (0-200 Hz):
16
80
90
118
150

Estimated Damping Ratios:
Mode near 16.00 Hz → ζ = 0.1250
Mode near 80.00 Hz → ζ = 0.0375
Mode near 90.00 Hz → ζ = 0.0333
Mode near 118.00 Hz → ζ = 0.0424
Mode near 150.00 Hz → ζ = 0.0200

Normalized Mode Shapes (0-200 Hz):

Mode at 16.00 Hz:
X: 0.061∠172.5°
Y: 0.126∠29.3°
Z: 1.000∠173.8°

Mode at 80.00 Hz:
X: 0.209∠-149.6°
Y: 0.084∠79.5°
Z: 1.000∠67.3°

Mode at 90.00 Hz:
X: 0.104∠39.0°
Y: 1.000∠76.9°
Z: 0.410∠-9.5°

Mode at 118.00 Hz:
X: 0.106∠119.3°
Y: 0.105∠-37.3°
Z: 1.000∠126.6°

Mode at 150.00 Hz:
X: 0.062∠-36.6°

Y: 0.256∠-115.0°
Z: 1.000∠16.9°

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

Freq_Hz	Damping	Phi_X	Phi_Y	Phi_Z
16	0.125	-0.060653+0.0079602i	0.11017+0.061712i	-0.99409+0.10859i
80	0.0375	-0.18013-0.10571i	0.015358+0.08251i	0.38573+0.92261i
90	0.033333	0.08081+0.065498i	0.22587+0.97416i	0.40397-0.067727i
118	0.042373	-0.052178+0.092808i	0.083824-0.063835i	-0.59671+0.80246i
150	0.02	0.050146-0.037246i	-0.1079-0.23184i	0.95688+0.29048i

Detected Resonant Frequencies (0-200 Hz):
16
80
90
118
150

Estimated Damping Ratios:
0.1250
0.0375
0.0333
0.0424
0.0200

=== Modal Summary (0-200 Hz) ===
Mode 1: f=16.00 Hz, Damping=0.1250, k_dyn_X=4093298.29 N/m, k_dyn_Y=1982884.99 N/m, k_dyn_Z=250400.09 N/m
Mode Shape (X,Y,Z): 0.061∠172.5°, 0.126∠29.3°, 1.000∠173.8°
Mode 2: f=80.00 Hz, Damping=0.0375, k_dyn_X=76153822.05 N/m, k_dyn_Y=189512479.97 N/m, k_dyn_Z=15905236.59 N/m
Mode Shape (X,Y,Z): 0.209∠-149.6°, 0.084∠79.5°, 1.000∠67.3°
Mode 3: f=90.00 Hz, Damping=0.0333, k_dyn_X=431415666.26 N/m, k_dyn_Y=44875963.60 N/m, k_dyn_Z=109557733.44 N/m
Mode Shape (X,Y,Z): 0.104∠39.0°, 1.000∠76.9°, 0.410∠-9.5°
Mode 4: f=118.00 Hz, Damping=0.0424, k_dyn_X=64269450.46 N/m, k_dyn_Y=64944826.28

N/m, k_dyn_Z=6842769.90 N/m
Mode Shape (X,Y,Z): 0.106∠119.3°, 0.105∠-37.3°, 1.000∠126.6°
Mode 5: f=150.00 Hz, Damping=0.0200, k_dyn_X=635415624.04 N/m,
k_dyn_Y=155213799.58 N/m, k_dyn_Z=39691424.48 N/m
Mode Shape (X,Y,Z): 0.062∠-36.6°, 0.256∠-115.0°, 1.000∠16.9°