Detected Resonant Frequencies (0-200 Hz):
18
88
150
188

Estimated Damping Ratios:
Mode near 18.00 Hz → ζ = 0.2222
Mode near 88.00 Hz → ζ = 0.0455
Mode near 150.00 Hz → ζ = 0.0267
Mode near 188.00 Hz → ζ = 0.0213

Normalized Mode Shapes (0-200 Hz):

Mode at 18.00 Hz:
X: 0.077∠10.2°
Y: 0.052∠16.2°
Z: 1.000∠8.6°

Mode at 88.00 Hz:
X: 0.100∠90.7°
Y: 1.000∠-11.6°
Z: 0.887∠-171.6°

Mode at 150.00 Hz:
X: 0.324∠24.1°
Y: 0.557∠-142.1°
Z: 1.000∠13.2°

Mode at 188.00 Hz:
X: 0.578∠-6.5°
Y: 1.000∠73.0°
Z: 0.683∠-10.1°
=== Modal Parameter Summary (0-200 Hz) ===

Freq_Hz	Damping	Phi_X	Phi_Y	Phi_Z

18	0.22222	0.076026+0.013689i	0.049614+0.014393i	0.98884+0.14895i
88	0.045455	-0.0011357+0.099792i	0.9796-0.20094i	-0.87703-0.12989i
150	0.026667	0.29521+0.13231i	-0.44007-0.3422i	0.97345+0.2289i
188	0.021277	0.57464-0.065548i	0.29236+0.95631i	0.67193-0.11986i

Detected Resonant Frequencies (0-200 Hz):

18
88
150
188

Estimated Damping Ratios:

0.2222
0.0455
0.0267
0.0213

=== Modal Summary (0-200 Hz) ===
Mode 1: f=18.00 Hz, Damping=0.2222, k_dyn_X=6123318.31 N/m, k_dyn_Y=9156460.24 N/m, k_dyn_Z=473015.20 N/m
  Mode Shape (X,Y,Z): 0.077∠10.2°, 0.052∠16.2°, 1.000∠8.6°
Mode 2: f=88.00 Hz, Damping=0.0455, k_dyn_X=1156981103.49 N/m, k_dyn_Y=115464859.20 N/m, k_dyn_Z=130233445.79 N/m
  Mode Shape (X,Y,Z): 0.100∠90.7°, 1.000∠-11.6°, 0.887∠-171.6°
Mode 3: f=150.00 Hz, Damping=0.0267, k_dyn_X=284621559.08 N/m, k_dyn_Y=165170512.97 N/m, k_dyn_Z=92075439.94 N/m
  Mode Shape (X,Y,Z): 0.324∠24.1°, 0.557∠-142.1°, 1.000∠13.2°
Mode 4: f=188.00 Hz, Damping=0.0213, k_dyn_X=364937655.67 N/m, k_dyn_Y=211068719.16 N/m, k_dyn_Z=309242849.09 N/m