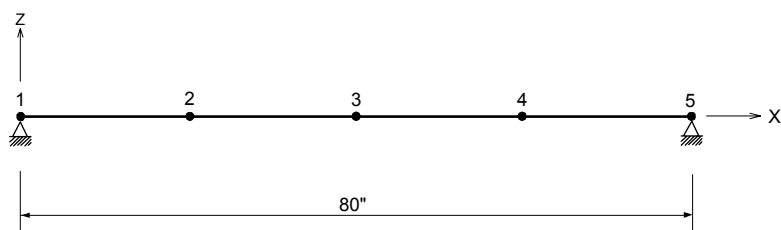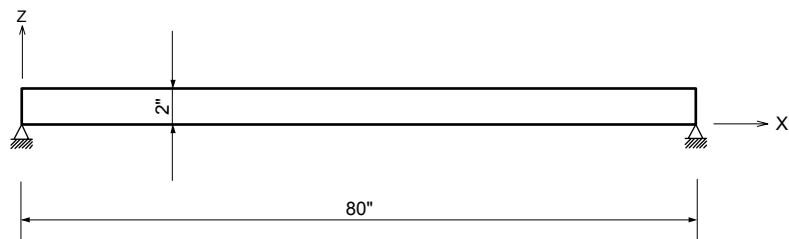# Eigen-12

Title

Fundamental frequency of a simply supported beam

Description

A simply supported beam is analyzed to determine the fundamental frequency.
Determine the fundamental frequency.

Structural geometry and analysis model

MODEL

Analysis Type

2-D eigenvalue analysis (X-Z plan)

Unit System

in, lbf

Dimension

Length 80in

Element

Beam element

Material

Modulus of elasticity $\quad$ E = 30.0×10^6 psi

Weight density $\quad$ γ = 0.281 lbf/in^3

Sectional Property

Rectangular cross-section: b = 2 in, $\quad$ h = 2 in

Boundary Condition

Node 1, 5: Constrain D_X and D_Z

Analysis Case

Eigenvalue analysis

Results

	EIGENVALUE ANALYSIS							
Mode No	Frequency		Period (sec)	Tolerance				
	(rad/sec)	(cycle/sec)						
1	180,699	28,759	0,035	6,6849e-016				

Fundamental frequency

Comparison of Results

Unit: Hz

Result	Theoretical	MIDAS/Civil
Frequency	28.766	28.759

References

Thomson, W. T., (1965). "*Vibration Theory and Application*", Prentice Hall, Englewood Cliffs, N. J.

3