

Free square frame

REFERENCE	Selected Benchmarks for Natural Frequency Analysis, Issue 2, NAFEMS, Glasgow, 1987
MODEL FILENAME	Free Square Plate.nfx

Figure 1 shows a square frame model with no boundary conditions. The square frame is modeled with 4 bar elements for each arm. The natural frequencies of the lowest vibration modes except for the rigid-body modes are compared with the reference solutions given in the NAFEMS benchmarks. The vibration mode shapes are depicted in Figure 2.

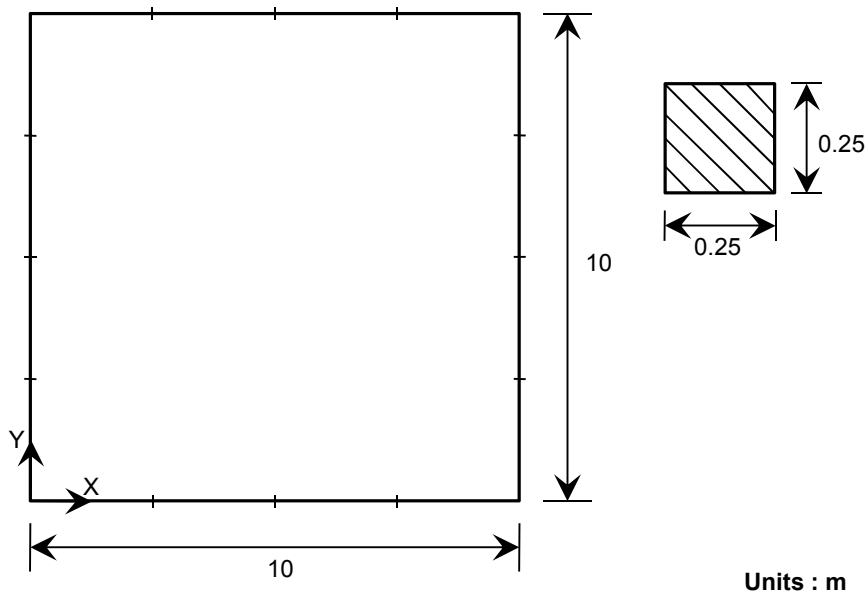


Figure 1. Free square frame model

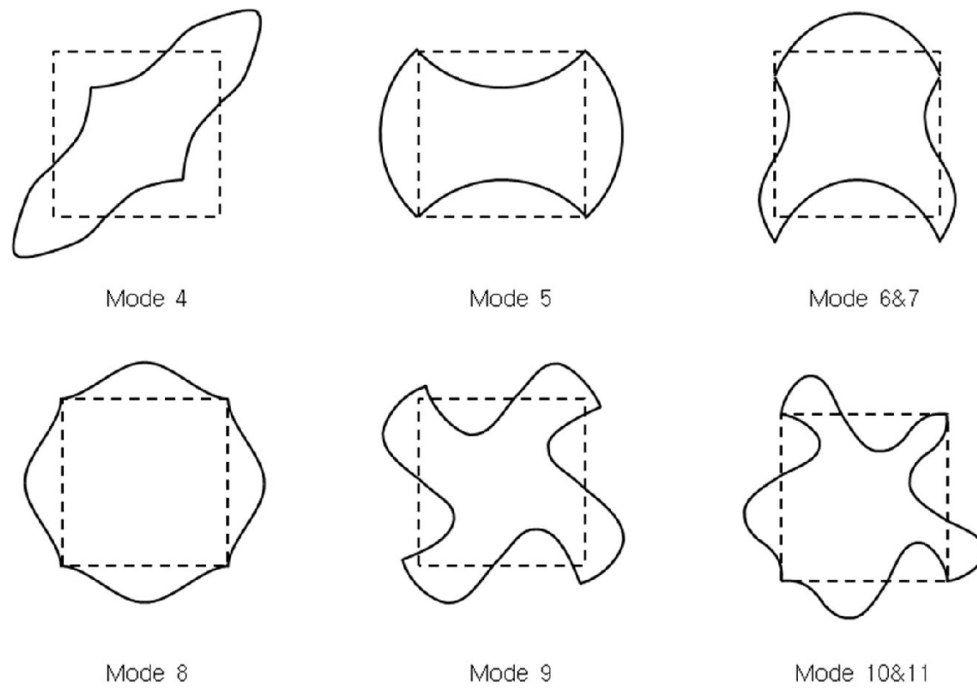


Figure 2. Vibration mode shapes

Material data	Young's modulus	$E = 200 \text{ GPa}$
	Density	$\rho = 8000 \text{ kg/m}^3$
Section property	Square cross-section	$0.25 \text{ m} \times 0.25 \text{ m}$

Table 3.3.1 Natural frequencies in Hz obtained using bar elements

Mode Number		4	5	6,7	8	9	10,11
Reference		3.261	5.668	11.136	12.849	24.570	28.695
Element type	Number of elements						
BAR-2	4 per arm	3.262	5.666	11.135	12.802	24.629	28.721