

One-dimensional heat transfer with radiation

REFERENCE The Standard NAFEMS Benchmarks, Rev. 3, NAFEMS, Glasgow, 1990

MODEL FILENAME 1D HT with radiation.nfx

Figure 1 shows a one-dimensional bar. The temperature is maintained at 1000 K at one end (point A). The other end at point B is exposed to radiation to an ambient temperature of 300 K. 10 elements in the length direction are used to model the bar. The temperature at the point B is obtained solid elements and compared with the reference solution given in NAFEMS.

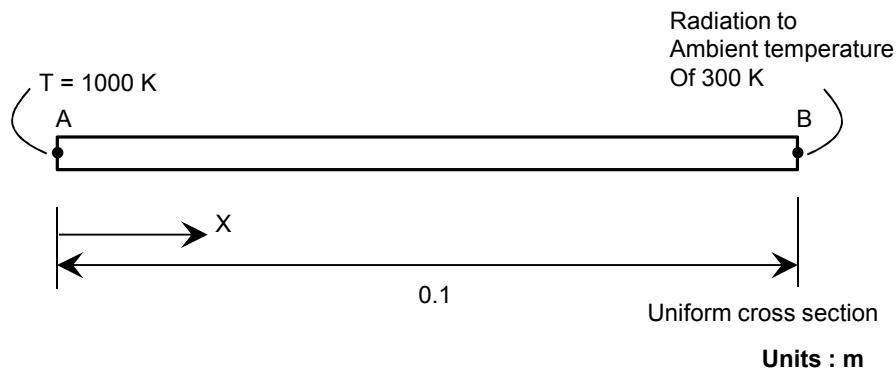


Figure 1. Column model

Material data	Conductivity	$k = 55.6 \text{ W/m}\cdot\text{°C}$
	Emissivity	$\varepsilon = 0.98$
	Stefan-Boltzmann constant	$\sigma = 5.67 \times 10^{-8} \text{ Wm}^2 \cdot \text{K}^{-4}$

Table 1. Temperature T at point B obtained using solid elements

		T_B [K]
Reference		927
Element type	Number of elements	
TETRA-4	60	924.4