One-dimensional transient heat transfer - Solid

REFERENCE	The Standard NAFEMS Benchmarks, Rev. 3, NAFEMS, Glasgow, 1990
MODEL FILENAME	1D TTH solid.nfx

Figure 1 shows a one-dimensional transient heat transfer problem with conduction. A temperature of $0\,°C$ is assigned to the point A. A time variant temperature of $100\sin(\pi t / 40)$ is set to the point B. The initial temperature of $0\,°C$ is applied at all of the nodes. Transient heat transfer analysis is carried out with a fixed time step of 1 second. The temperature at the point C at time t=32 sec is obtained using various finite elements. The solution from the NAFEMS benchmarks is taken as a reference for comparison.
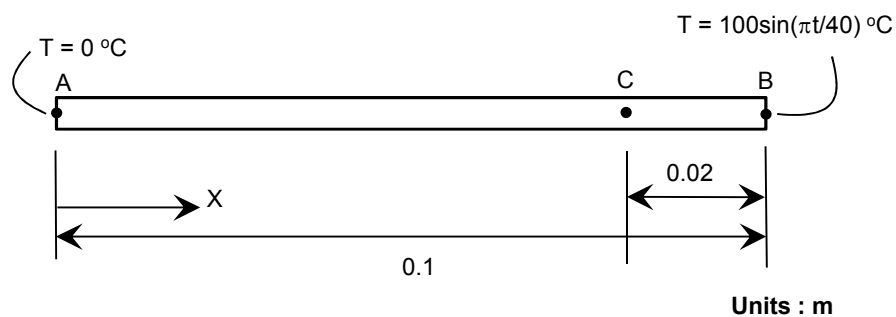

Figure 1.   One-dimensional transient heat transfer problem

	Conductivity	$k = 35.0\ W/m\cdot°C$
Material data	Specific heat	$C= 440.5\ J/kg\cdot°C$
	Density	$\rho=7200\ kg/m^3$

Table 1.   Temperature at point C obtained using solid elements

		T_C [$°C$]
Reference		*36.60*
Element type	Number of elements	
HEXA-8	1x1x10	**35.51**

*   averaged temperature from nodes.