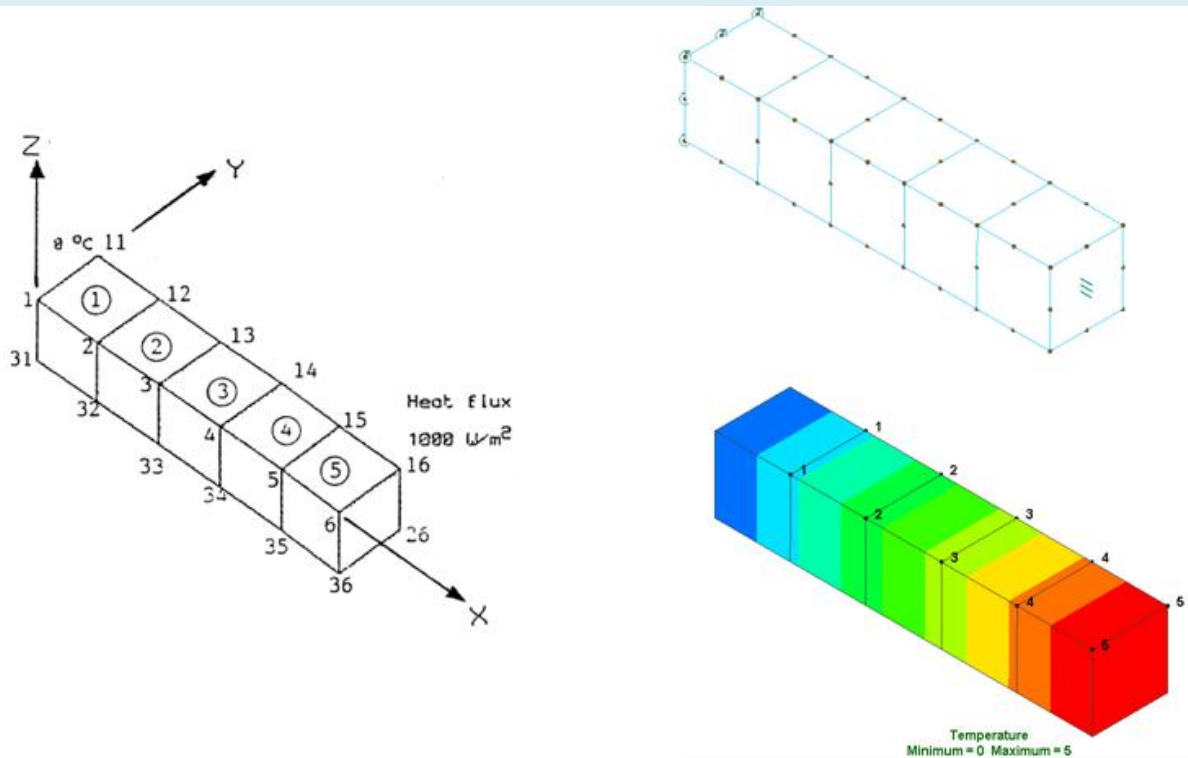


One dimensional heat conduction in a bar



Material property : $K_{XX} = K_{YY} = K_{ZZ} = 200 \text{ W/m}^\circ\text{C}$

3-D eight node solid element. A 1.0 m long bar with a square cross section (0.2x0.2 m) is subjected to a flux of 1000 W/m^2 at one end. The other end of the bar is fixed at 0°C . All other surfaces are insulated.

Element type : The temperature distribution at steady state is calculated. The bar is modeled using five equal size 8 node solid elements. The flux load is specified as a surface flux on the element face at $X = 1.0 \text{ m}$. The nodes at $X = 0$ are fixed at 0°C temperature.

| | | | |
|----------------------------------|------------------------|---------------------------|---------------------------|
| Finite element statistics | Number of nodes | Number of elements | Degrees of freedom |
| : | 68 | 5 | 60 |

| Output parameters | Theoretical value | FEAST ^{SMT} | NISA2 [®] |
|---|-------------------|----------------------|--------------------|
| Temperature distribution in $^\circ\text{C}$ at locations | | | |
| X=0.2 (m) | 1 | 1 | 1 |
| 0.4 | 2 | 2 | 2 |
| 0.6 | 3 | 3 | 3 |
| 0.8 | 4 | 4 | 4 |
| 1.0 | 5 | 5 | 5 |