

Subject: Solid Mechanics Simulation

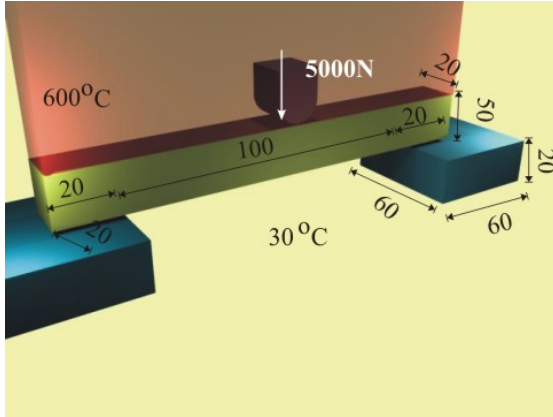


Fig. 1

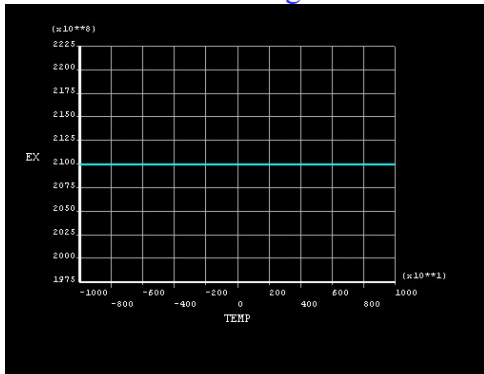


Fig.2a Material 1

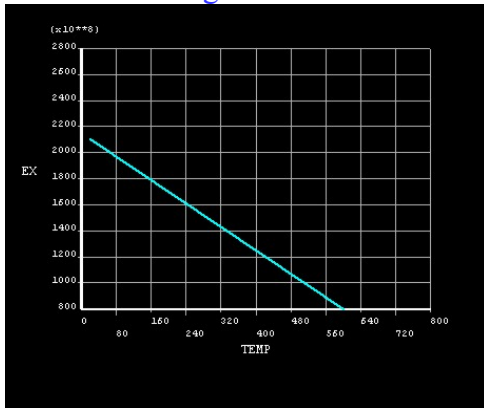


Fig.2b Material 2

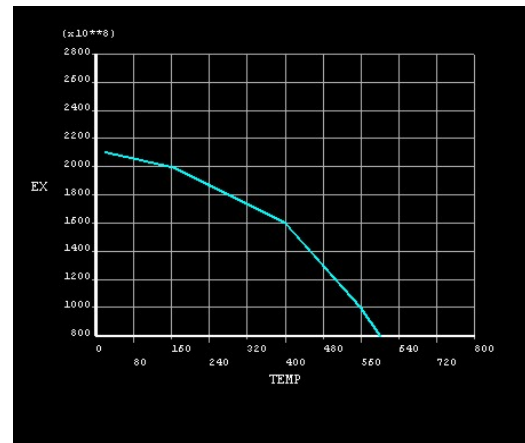


Fig. 2c Material 3

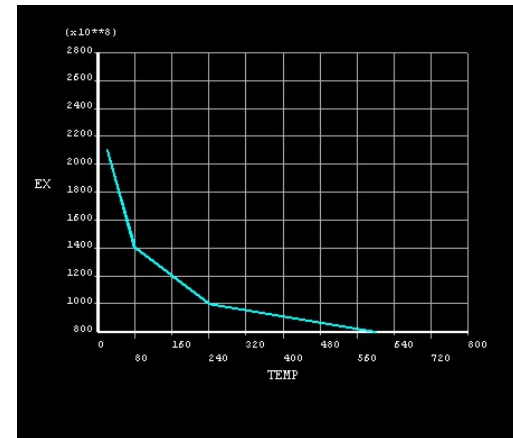


Fig. 2d Material 4

Assignment: The beam with dimensions 140x20x50 cm is fixed and loaded as is shown in fig.1. The beam is isolated at boundaries and exchange heat at contacts with supported plates. The beam material is homogeneous linear elastic with Poisson's ratio $\nu=0.27$ and temperature-dependant module of elasticity (fig. 2).

Determine the stress and strain state in varies temperature-elasticity dependences.

Submit:

1. Geometrical model, including the mesh and the boundary conditions.
2. The stress (von Mises) state for *Material 2*.
3. The strain state for *Material 3*.
4. Compare the flexure of the beam for the materials in fig. 2.

Answer the next questions:

1. What is the mechanical behaviour peculiarity of the material and where it is treated in the solution?
2. What element type was used?
3. What element options were used?
4. What real constants were used?
5. How many nodes and elements were created?
6. What is the % error for your solution?