
Problem 406

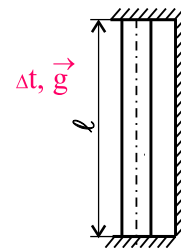
A homogeneous prismatic bar is fixed without any clearance or interference between two rigid jaws having a constant distance. Determine the distribution of stresses along the bar centreline created by gravitational forces and by a uniform temperature increase of Δt .

Production inaccuracies of the bar are negligible.

Input values:

$$S = 500 \text{ mm}^2, \quad l = 10 \text{ m}, \quad \rho = 7,8 \cdot 10^3 \text{ kgm}^{-3}$$

$$\alpha = 12 \cdot 10^{-6} \text{ K}^{-1}, \quad \Delta t = 60^\circ.$$



tension

volume forces

thermal dilatation