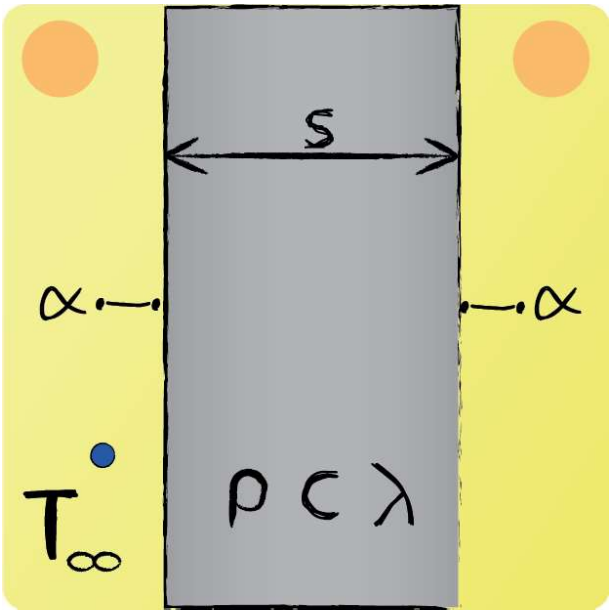
Exam Preparation - Conduction 23

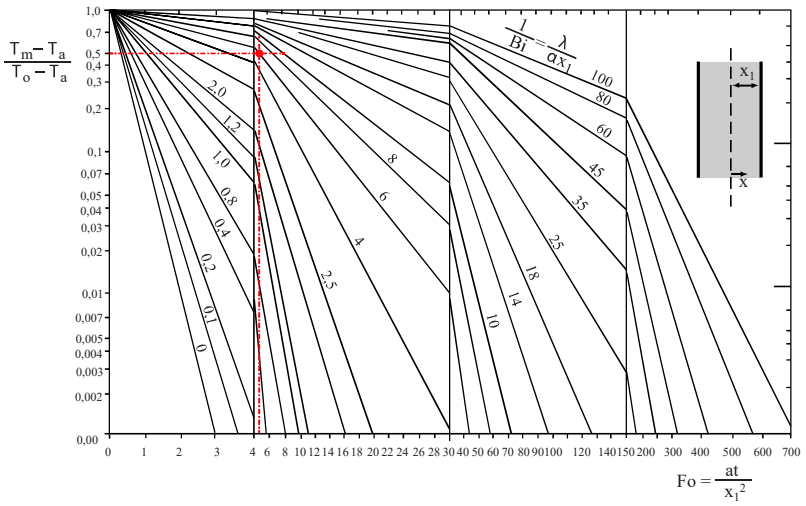


A plate with thickness $x = 2$ cm with initial homogeneous temperature $T(x, t = 0) = 293$ K, is suddenly exposed to a medium of temperature $T_\mathrm{A} = 353$ K. Determine the time t_1 at which $T(x = 0, t_1) = 323$ K is reached.

Problem type:
One-dimensional, unsteady-state heat conduction that does penetrate.

$$\frac{1}{\mathrm{Bi}} = \frac{\lambda}{\alpha \cdot x_1} = 6$$

$$\frac{T_\mathrm{m} - T_\mathrm{a}}{T_\mathrm{o} - T_\mathrm{a}} = 0.5$$



$$\rightarrow \mathrm{Fo} = 4.69$$

$$t = 2108.11 \text{ s}$$