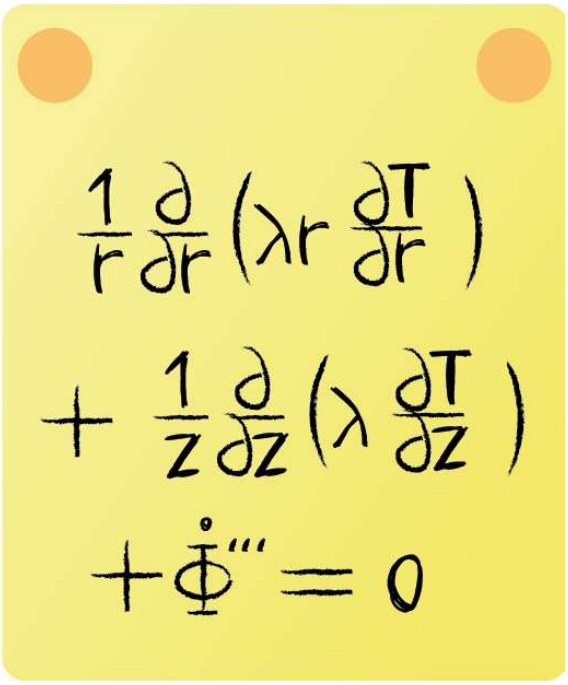
Lecture 13 - Question 4



Consider a medium in which the heat conduction equation is given in its simplest form as:

$$\frac{1}{r}\frac{\partial}{\partial r}\left(\lambda r \frac{\partial T}{\partial r}\right) + \frac{\partial}{\partial z}\left(\lambda \frac{\partial T}{\partial z}\right) + \dot{\Phi}''' = 0$$

How many boundary conditions are needed to solve the equation?

Four boundary conditions

From the heat conduction equation it can be seen that it is a two-dimensional problem. One knows that for a one-dimensional problem two boundary conditions are required. Thus four boundary conditions are required.