

## Heat Conduction in a Rod with a Non-uniform Thermal Diffusivity

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### Abstract

Let  $L$  be the length of a rod and  $u(x, t)$  be its temperature for  $(x, t) \in [0, L] \times [0, \infty)$ . We assume that the initial and boundary temperatures of the rod are  $f(x)$  and 0 respectively. This heat conduction problem is formulated as the following first initial-boundary value problem:

$$u_t = \frac{1}{\sigma} u_{xx} \text{ for } 0 < x < L, t > 0,$$

$$u(x, 0) = f(x) \text{ for } 0 \leq x \leq L, u(0, t) = 0 = u(L, t) \text{ for } t > 0.$$

where  $\sigma$  is a positive function and  $f$  is a nonnegative function. In this paper, we study an approximated solution to the above problem.