Abstract

This paper proposes a separation of variables solution to the equation for heat transfer by conduction in simply-shaped, homogeneous and isotropic bodies subjected to cooling or heating processes without a phase change and with an internal heat source that is a linear function of temperature and subject to homogeneous external conditions of the third kind. The solution is given by the sum of an infinite Fourier series. Starting from this solution, the paper also proposes a simple calculation of chilling time based on an approximation to the first term of that solution (exponential zone); it further proposes a first approximation to the maximum value attained by the temperature history, and to the corresponding time.