

ABSTRACT

In this study, one dimensional transient heat conduction for large plane wall, long cylinder and solid sphere have been considered. The governing differential equations and related boundary conditions have been nondimensionalized.

The temperature distribution has been numerically obtained for a wide range of Biot number by using the exact solution which is obtained by utilizing the separation of variables technique. Similarly temperature distribution has been calculated by using the simplified method which is known as one term approximation. Specially for the Fourier number less than 0.2, the errors between two methods were obtained.

In transient heat conduction, since evaluation of infinite series is tedious, a correction factor between one term approximation and exact solution have been looked for. The variation of this factor was given graphically and mathematically.

Finally by using the first two term of the infinite series solution an alternative approach have been developed and the errors between this solution and exact solution have been investigated.

Keywords: Transient heat conduction, one term approximation solution.