Abstract

The effect of the constant and variable thermal conductivity on the temperature distribution for different materials had been carried out. A uniform heat generation was supplied to each of the selected materials. Three materials were chosen for this study (Copper, Aluminum and Iron). Analytical solution with MATLAB programming had been accomplished for the equation of temperature distribution for a solid sphere with steady state conditions. ANSYS simulation had been executed to ensure the results numerically. The results show that the effect of thermal conductivity to the temperature distribution in the case of Iron model is very significant due to the low thermal conductivity of Iron. The curvature of temperature distribution for Iron model is higher humping than the other selected materials (Aluminum and copper). The comparison between the analytical and numerical gives a very good agreement with a percentage error almost non-existent.


Index Terms

Computer Science

Applied Sciences

Keywords

Solid sphere, thermal conductivity, temperature coefficient of thermal conductivity, temperature distribution.