

1. Find the steady-state temperature distribution for the semi-infinite plate thermal problem if the temperature of the bottom edge is $T = f(x) = x$, the temperature of the other sides is zero, and the width of the plate is h .
2. Solve the semi-infinite plate thermal problem if the bottom edge of width L is held at $T = T_0 \cos \frac{\pi x}{L}$ and the other sides at zero temperature.
3. A bar of length l is with insulated sides has its ends also insulated from time $t = 0$ on. Initially the temperature was $T(x) = x$, where x is the distance from one of the ends. Determine the temperature distribution inside the bar at time t .
4. Find the steady-state temperature distribution inside the sphere of radius R when the surface temperatures are given by
 - a) $35 \cos^4 \theta$
 - b) $\cos \theta - \cos^3 \theta$
 - c) $\begin{cases} \cos \theta, & 0 < \theta < \pi/2 \\ 0, & \frac{\pi}{2} < \theta < \pi \end{cases}$
 - d) $\sin \theta \cos \theta \sin \varphi$