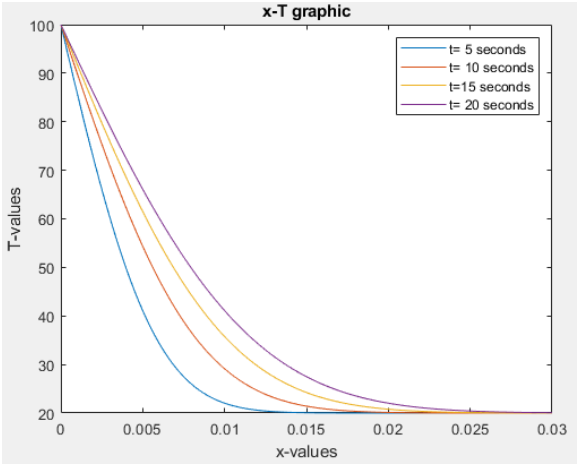
MAT 116E Advanced Scientific and Engineering Computing

Lab-4

Q-1. The temperature of a solid plate is initially at $T_i = 20°C$. It is then exposed to a stream of air that maintains the surface temperature of the plate to be $T_s = 100°C$. The temperature within the plate can be calculated using the following formula:

$$\frac{T - T_s}{T_i - T_s} = \text{erf}\left(\frac{x}{2\sqrt{\alpha t}}\right)$$

where x is the depth into the plate in meters over the range of $0 < x < 0.03$, $\alpha = 2.0 \times 10^{-6}\ m^2/s$ is the thermal diffusivity, t is the time in seconds, and $\text{erf}(z)$ is the error function. Using the above informations, Plot the graph of T respect to x for the following times: t=5, 10, 15, 20 seconds. Provide a plot title, labels for the axes and a legend for the four curves. Compare your result with following graphic.



Q-2. Write a matlab program to obtain the the following graphics if $y_1(t) = 10^3 t$ and $y_2(t) = 5t^3 - 2t^2 + 3t$.

Note: In first(y1), second(y2) and third(y1 and y2) graph, t is in the interval [-15,15] , [-15,15] and [-20,20], respectively. Increment of this axis(t-axis) is 1.