Lab-10

1. Write a program that carries out numerical integration of a function using composite trapezoid rule and composite Simpson's rule. Using the exactly integrable function f(x) $= e^x$ (say, integrated from 0 to 1), find out how the error in the two methods scale with number of intervals used.

2. The integral which gives the time period of a simple pendulum for an oscillation of amplitude θ_0 : $T = 4\sqrt{\frac{L}{g}} \int_0^{\pi/2} \frac{dx}{\sqrt{1-k^2(\sin(x))^2}}$, where $k = \sin(\theta_0/2)$. Do a least square fit of the following experimental data on a simple pendulum (of length 1 meter) and find the value of g from the fit.

   $\theta_0 = [0.20.40.60.81.01.21.4]$ and $T = [2.012.032.052.092.052.182.28]$

   You may use the matlab function fminsearch for doing the least squrae fit.