1.

Using Eulers method, find the difference equation to be programmed into the control computer in the case where

$$D(s) = \frac{U(s)}{E(s)} = K\frac{(s+2)}{(s+0.5)}$$

Write pseudo code for a controller to a physical system

2.

Design a lead controller

$$D(s) = k\frac{s+a}{s+b}$$

For the plant

$$G(s) = \frac{1}{s(s+1)}$$

Assume unity feed back

Demands: Wc = 2 and the phase margin > 45

Find digital controllers to implement the lead controller using the sample rates of 10 Hz, 20 Hz and 40 Hz

Plot the step response for the continuous system and the digital systems