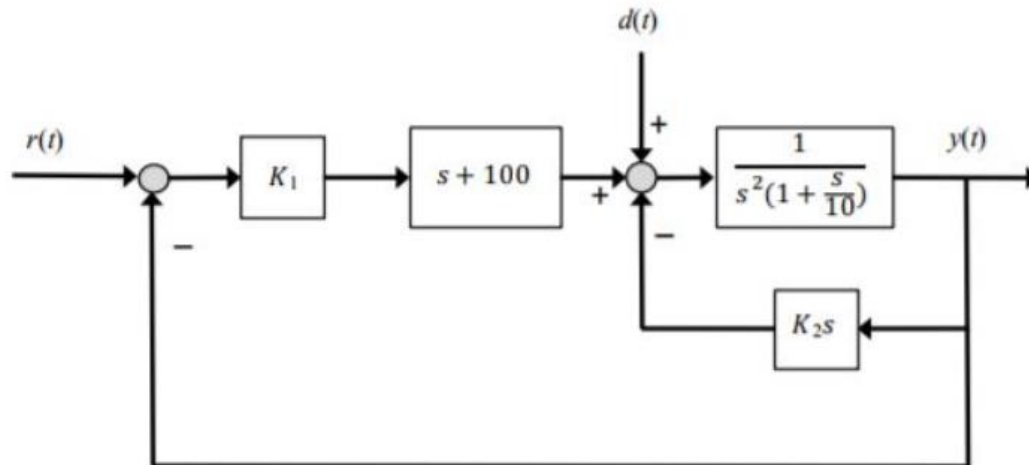


A position control system is given below. Use the MATLAB simulation tool (including Simulink) to design the controller and to select the appropriate parameters. Please document your source code (submit the code or Simulink block diagrams), show your simulation results, and provide an analysis of obtained results. You are allowed to work in groups of two students.



1. Set  $d(t) = 0$  and then design the controller (select gains  $K_1$  and  $K_2$ ) in order to provide a high-quality position control systems. Select a set of performance criteria and then examine the results of your design to check if the criteria are met.
2. For such designed controller parameters in part 1, set  $r(t) = 0$  and determine the effect of the disturbance to the output  $y(t)$ .
3. Provide simulation results in a realistic scenario where  $r(t) \neq 0$  (you can select an appropriate reference input) and where  $d(t)$  is a noise in the system.