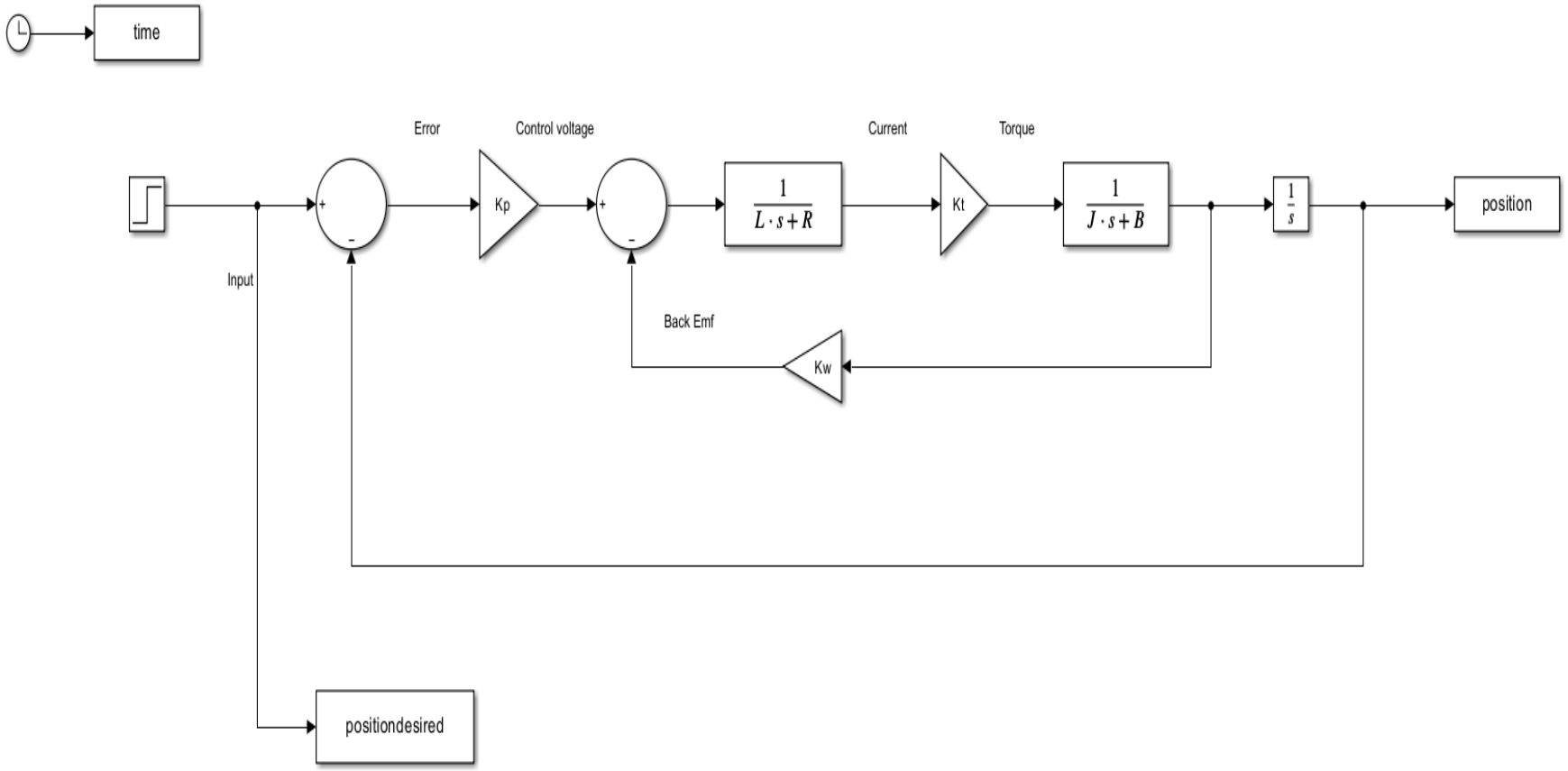
Mechatronics Assignment-2 – Position Control

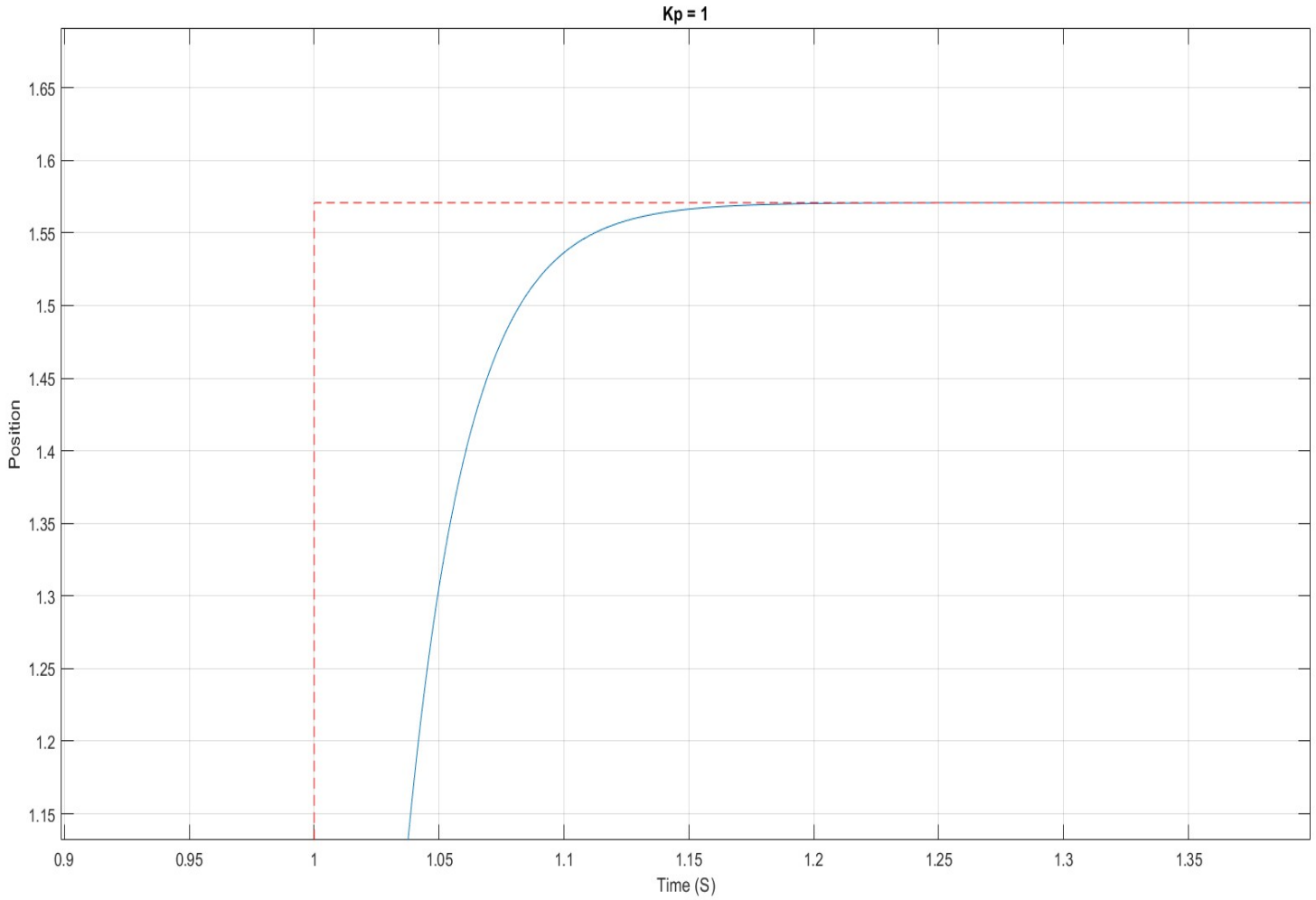
1. This week, find a computer where you can run Matlab and Simulink----------Installed the Matlab and Simulink

2. We will model a 2nd order system based on controlling the Position of a motor

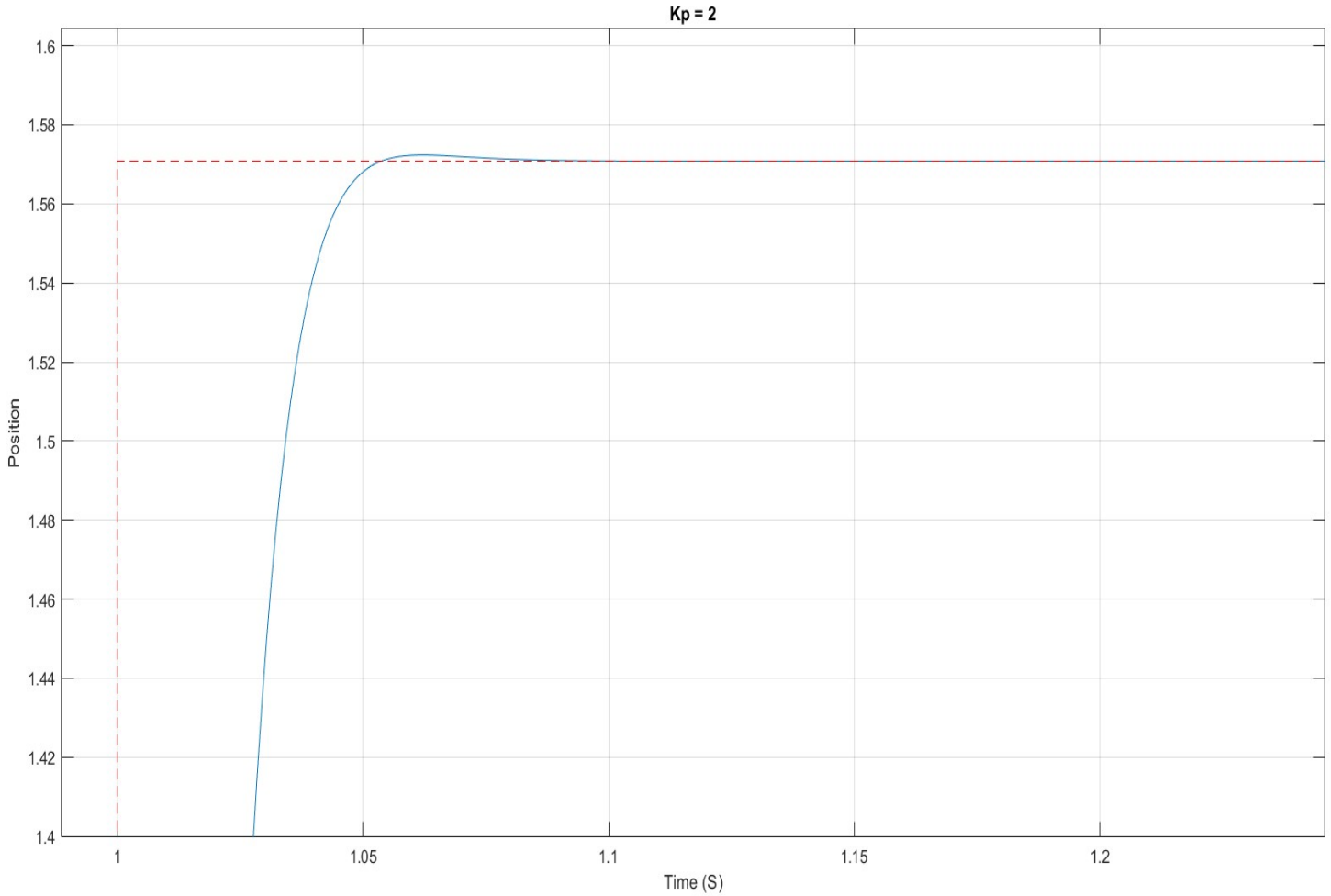
3. Please turn in 8 plots plus a screen shot of your Simulink model 3. 1. Below is the Model with Step Response



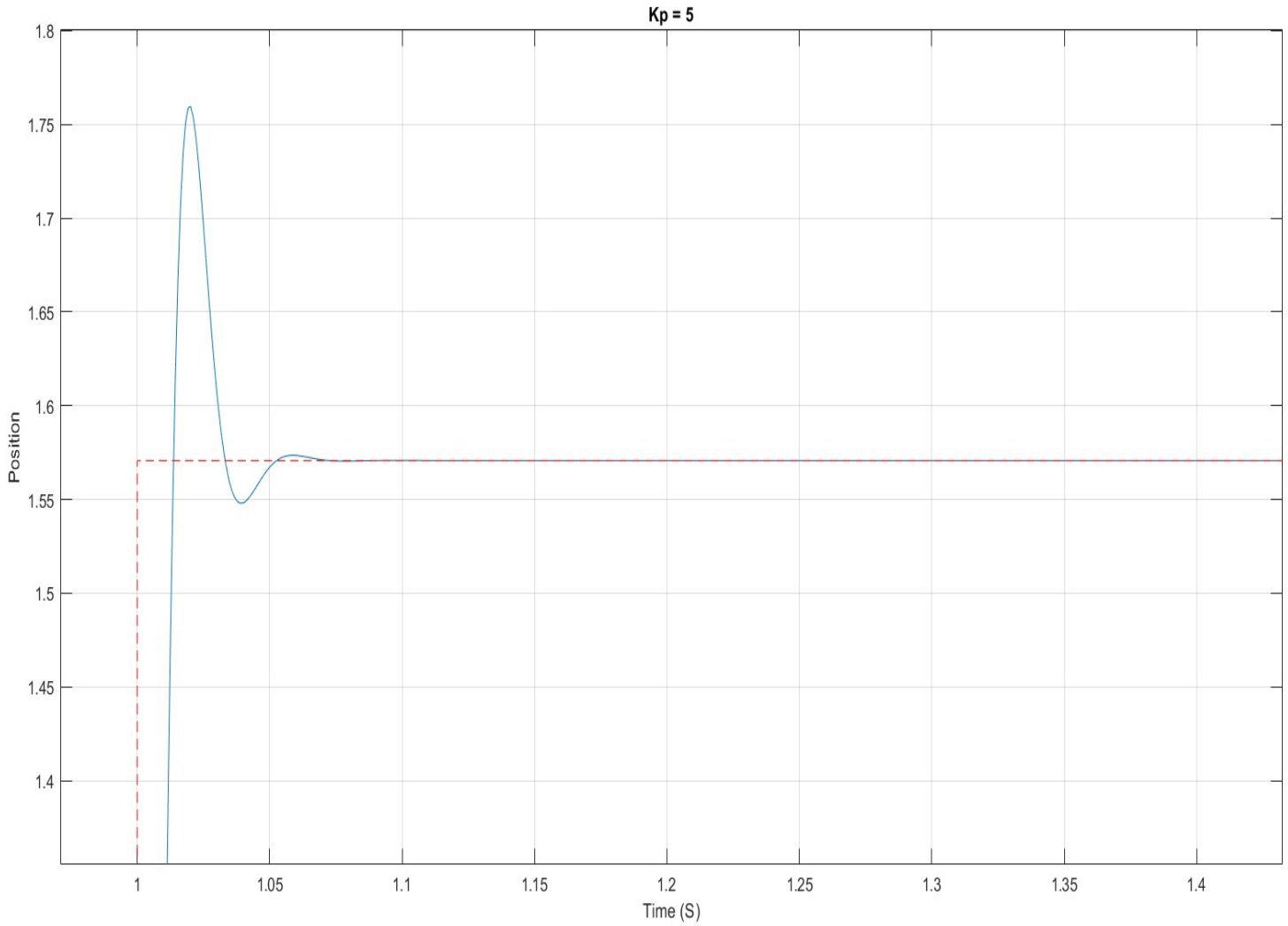
Kp = 1


Kp = 1
Position
Time (S)
1.65
1.6
1.55
1.5
1.45
1.4
1.35
1.3
1.25
1.2
1.15
0.9
0.95
1
1.05
1.1
1.15
1.2
1.25
1.3
1.35

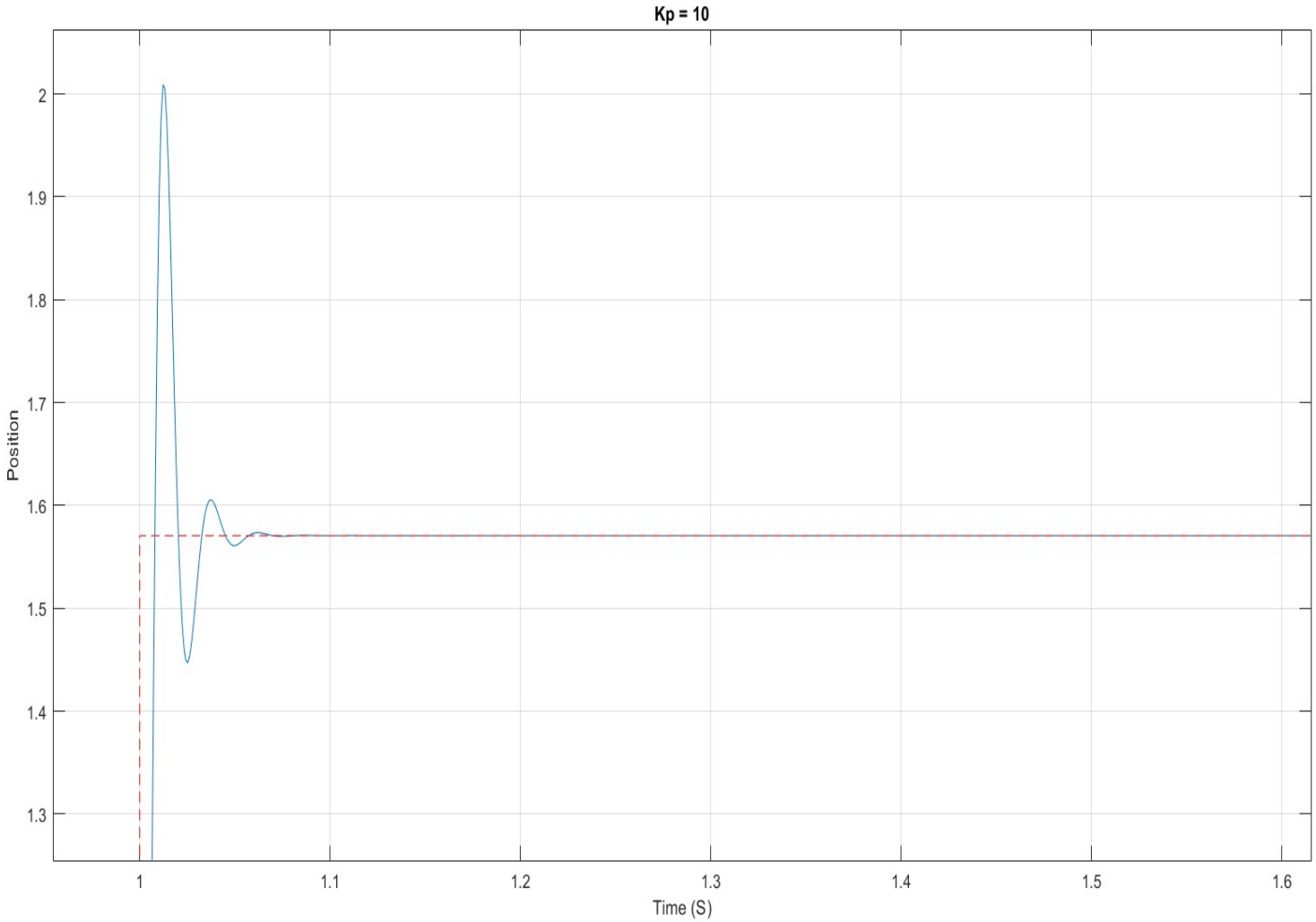
Kp = 2


Kp = 2
Position
Time (S)
1.6
1.58
1.56
1.54
1.52
1.5
1.48
1.46
1.44
1.42
1.4
1
1.05
1.1
1.15
1.2

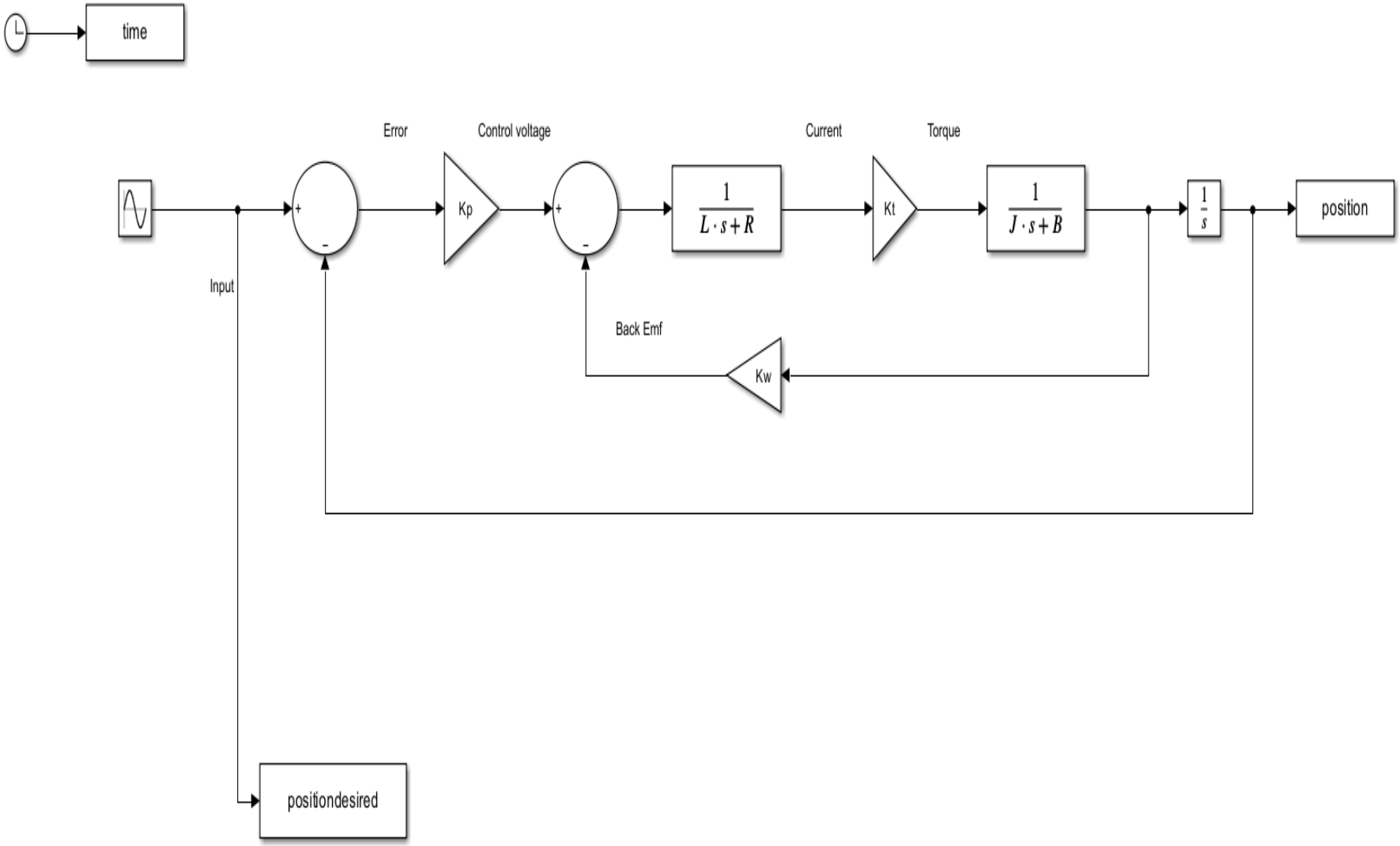
Kp = 5


Kp = 5
Position
Time (S)
1.8
1.75
1.7
1.65
1.6
1.55
1.5
1.45
1.4
1
1.05
1.1
1.15
1.2
1.25
1.3
1.35
1.4

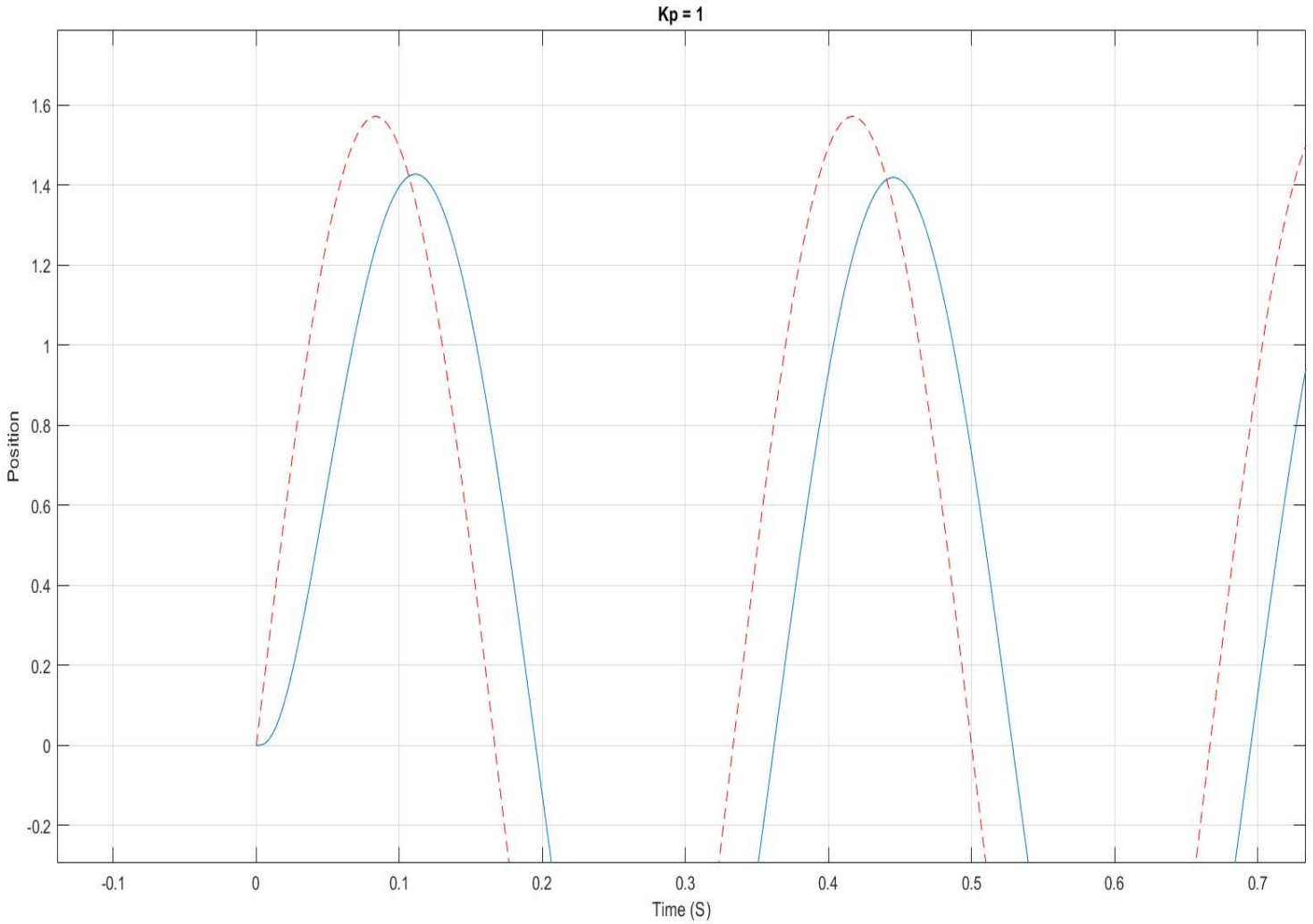
Kp = 10



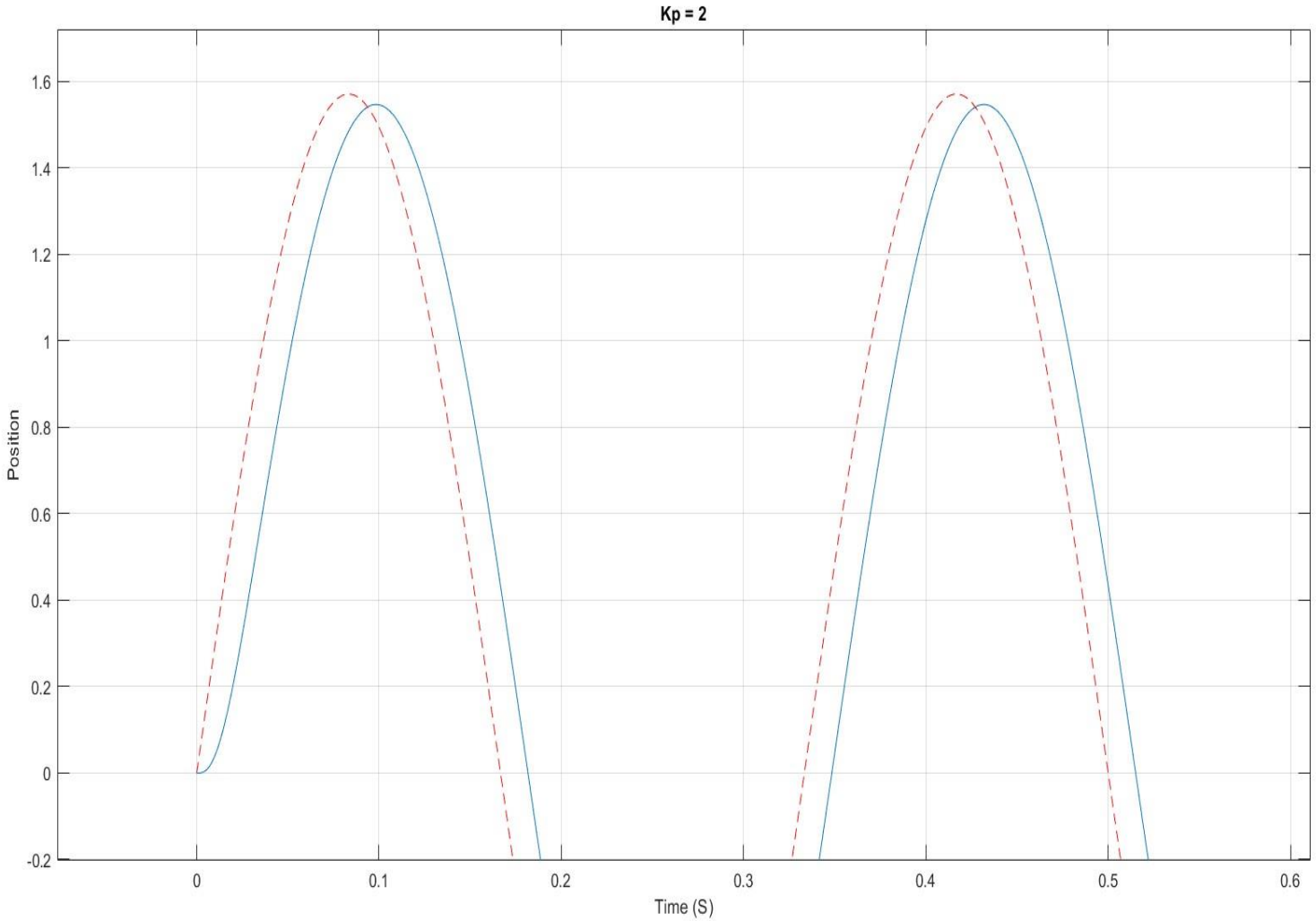
3.2. Below is the Model with Sinusoidal Response



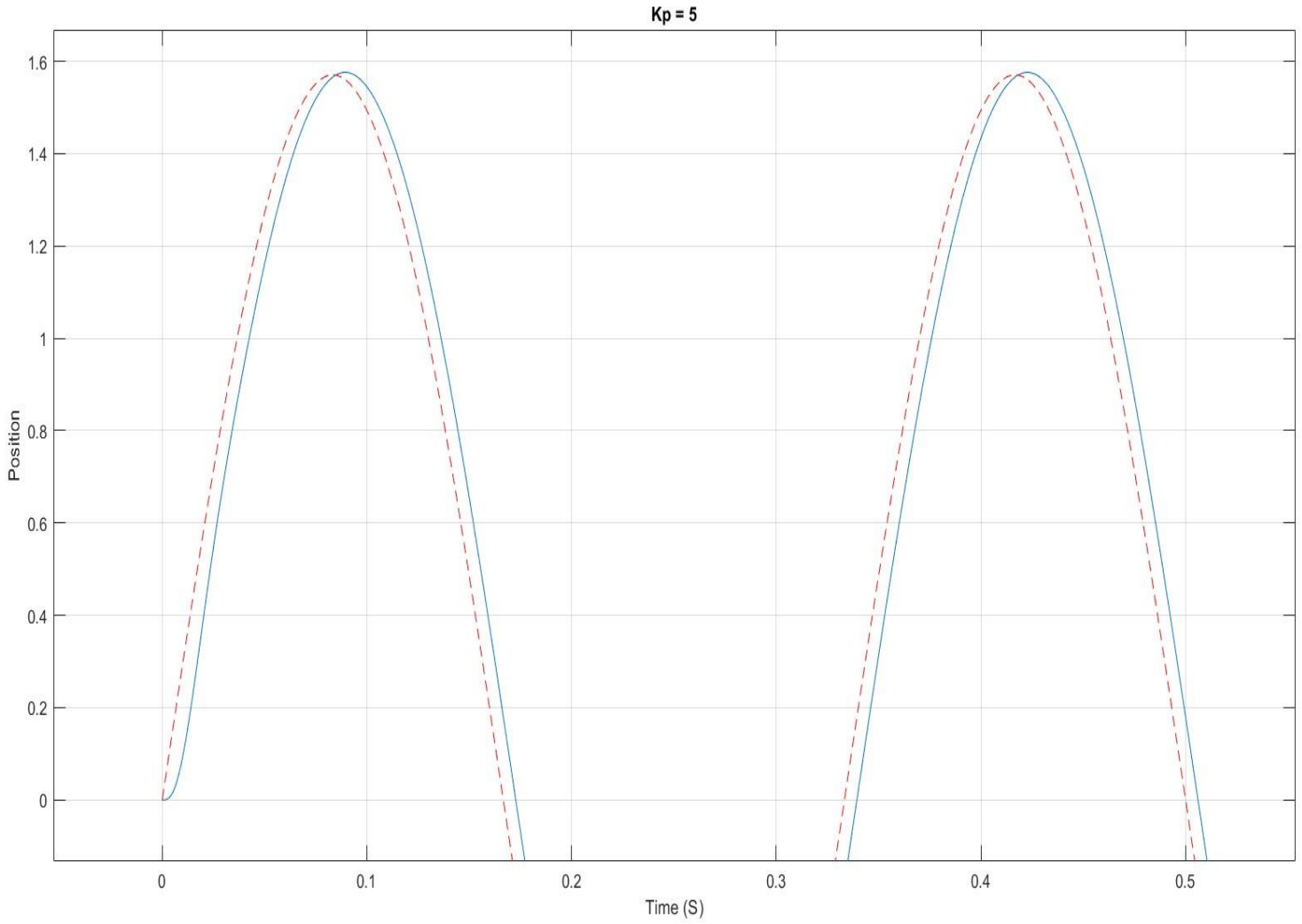
Kp = 1


Kp = 1
Position
Time (S)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

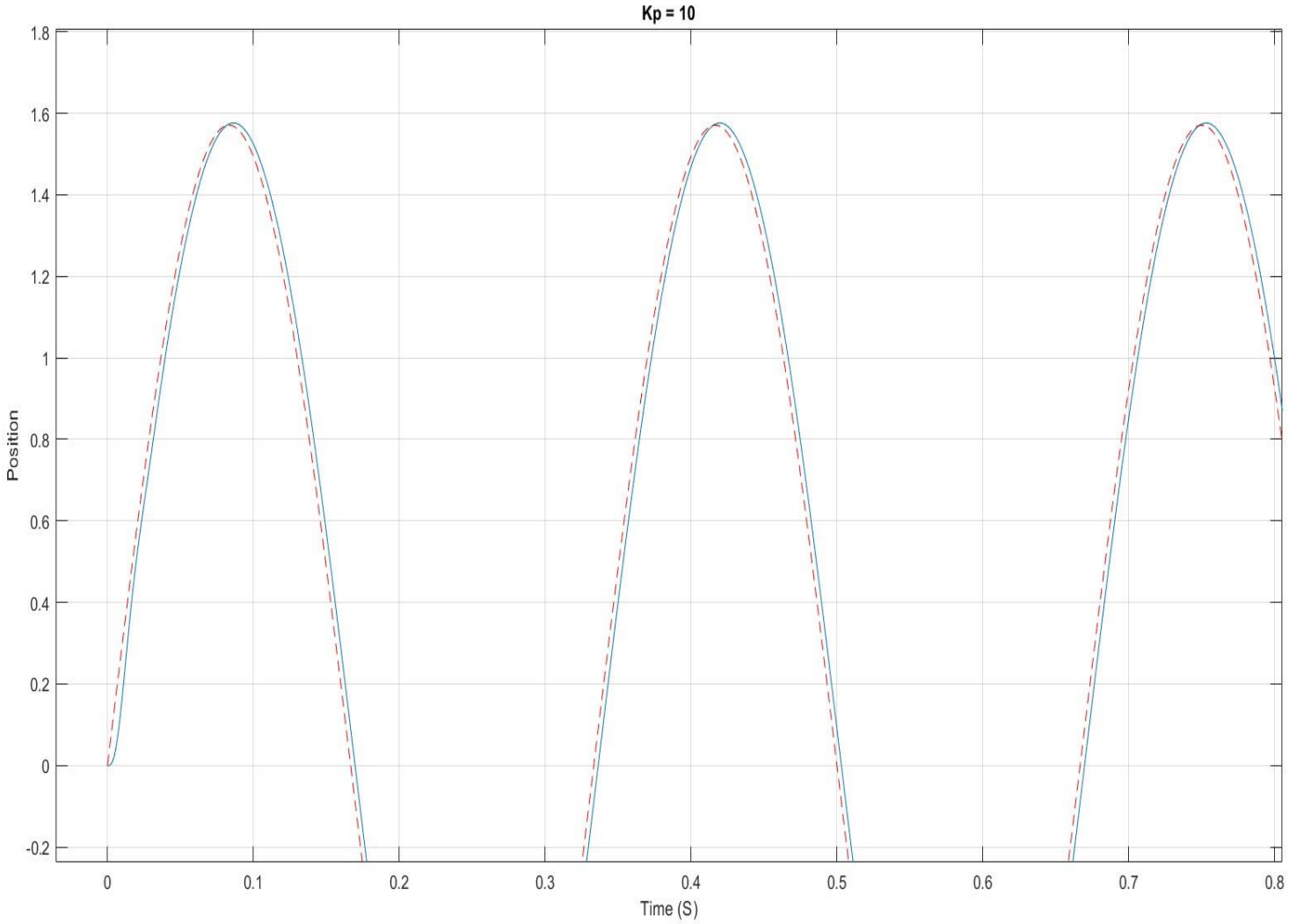
Kp = 2



Kp = 5

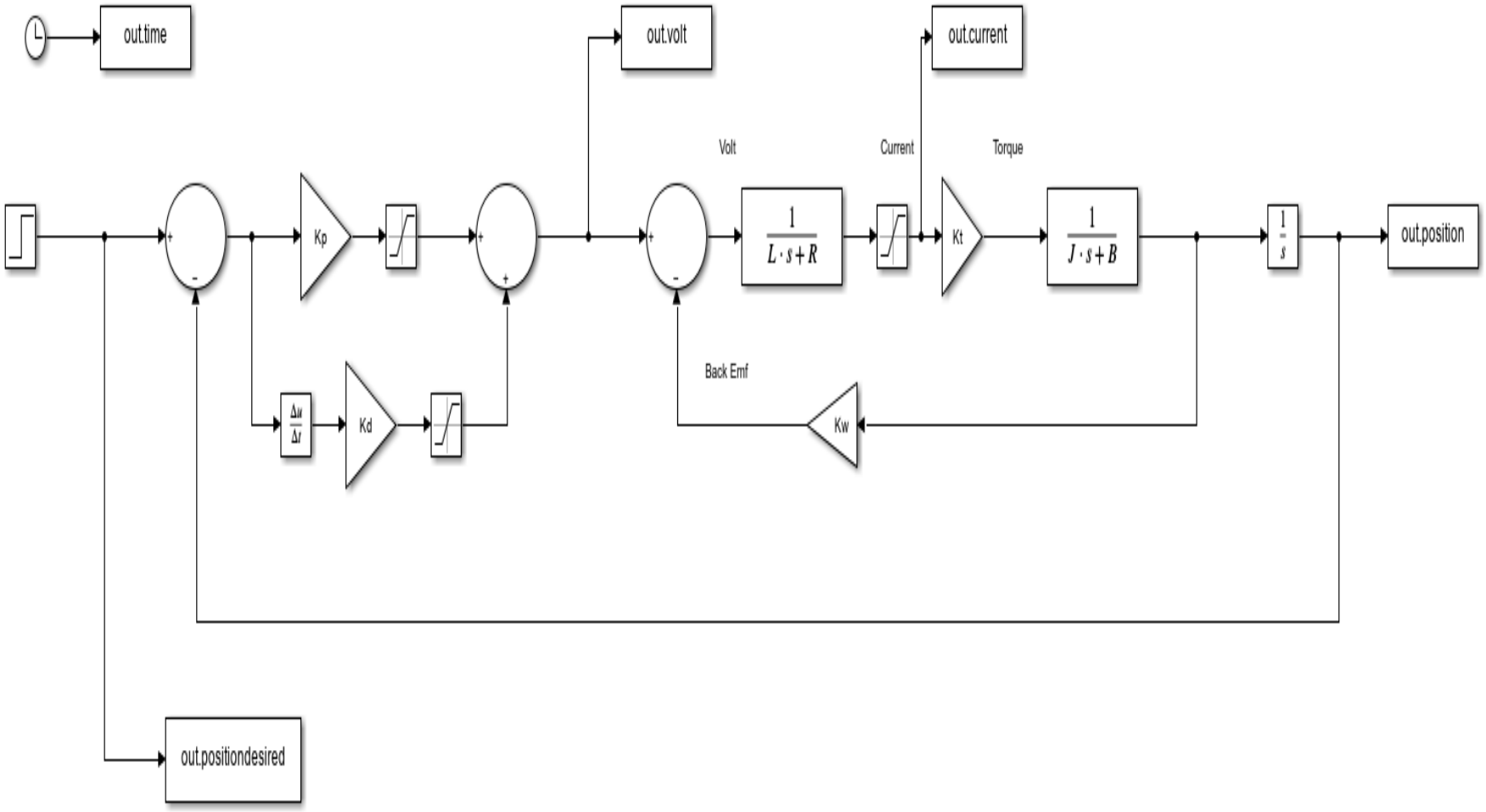


Kp = 10

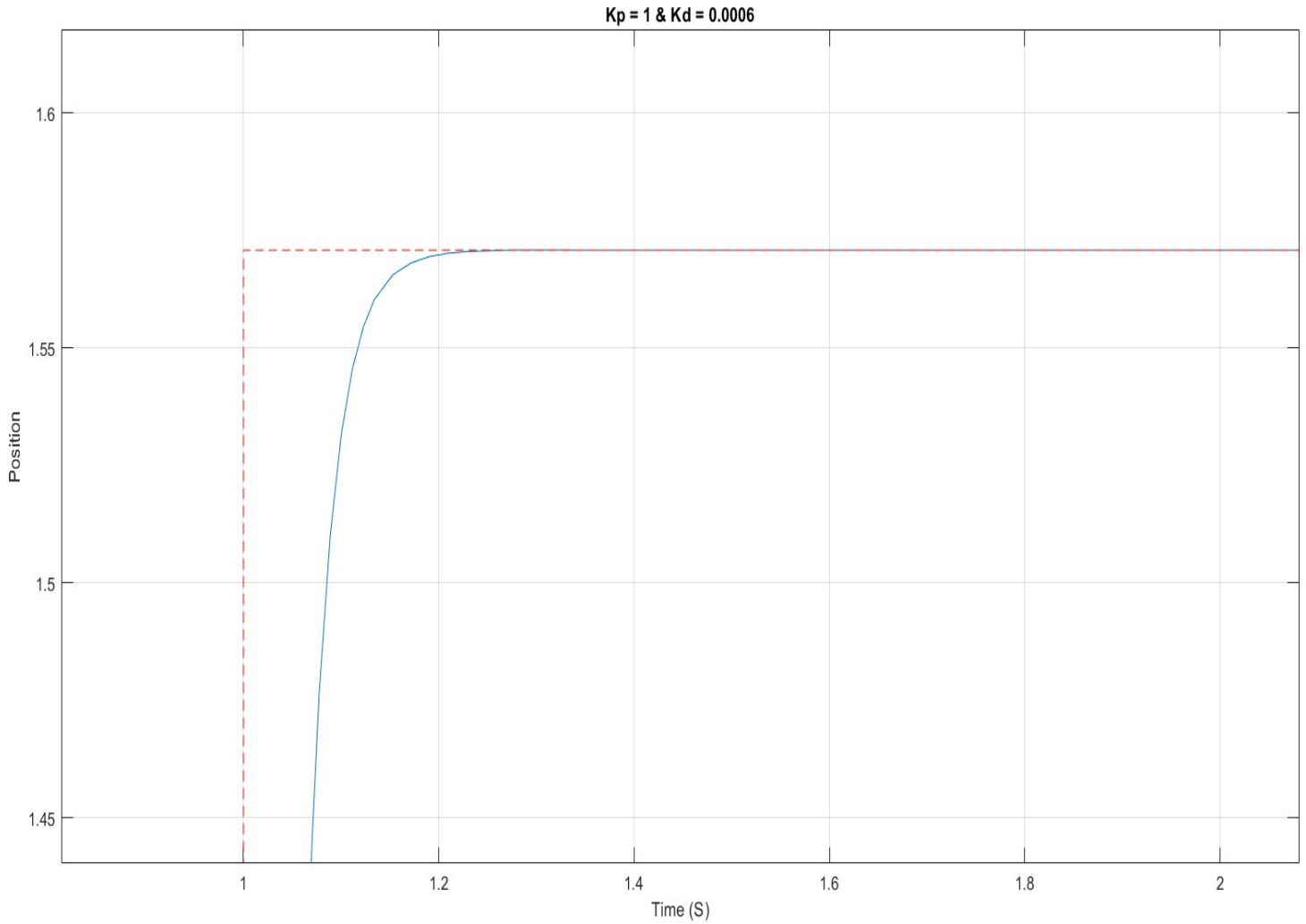

Kp = 10
Position
Time (S)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

4. Develop a model with both Kp and Kd and make sure there is no overshoot

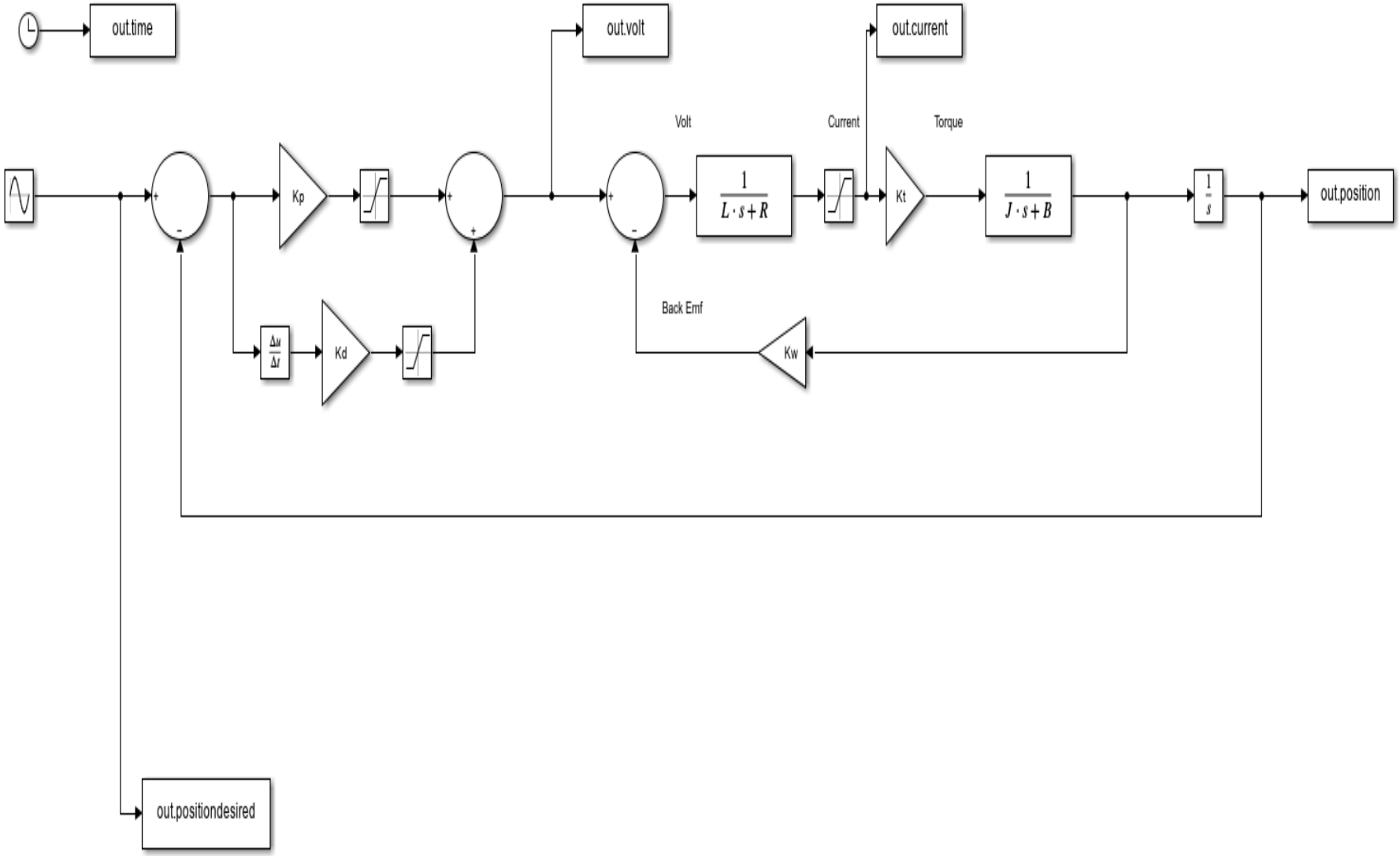
The Step response with both Kp and Kd and has no overshoot



And the best **step response** for Kp = 1 and Kd = 0.0006



The sinusoidal response with both Kp and Kd and has no overshoot



And the best **Sinusoidal response** for Kp = 5 and Kd = 0.0009