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```
clear all;
% Spencer Goulette
% 02/04/20
```

## Problem 2

```
K = 200; % Control parameter

% Simulink for K = 200
out = sim('ECE414HW3_2',...
    'StartTime', '-.1e-6',...
    'StopTime', '500',...
    'MaxStep', '1e-3');

open_system('ECE414HW3_2');

% Get data from Simulink
data = out.get('simout');
t1 = data.Time;
r1 = data.Data;

K = 400; % Control parameter

% Simulink for K = 400
out = sim('ECE414HW3_2',...
    'StartTime', '-.1e-6',...
    'StopTime', '500',...
    'MaxStep', '1e-3');

% Get data from Simulink
data = out.get('simout');
t2 = data.Time;
r2 = data.Data;

K = 1000; % Control parameter

% Simulink for K = 1000
out = sim('ECE414HW3_2',...
    'StartTime', '-.1e-6',...
    'StopTime', '500',...
    'MaxStep', '1e-3');

% Get data from Simulink
data = out.get('simout');
t3 = data.Time;
r3 = data.Data;

K = 2000; % Control parameter

% Simulink for K = 2000
out = sim('ECE414HW3_2',...
    'StartTime', '-.1e-6',...
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        'StopTime', '500',...
        'MaxStep', '1e-3');

% Get data from Simulink
data = out.get('simout');
t4 = data.Time;
r4 = data.Data;

% Plot data for all 4 control parameters
% K = 200 subplot
subplot(2,2,1);
plot(t1,r1,[0,500],[0.1,0.1], '-.r',[0,500],[0.9,0.9], '-.r',[0,500],
[1.1,1.1], '-.b');
grid on;
xlim([0 500]);
title("K = 200");
xlabel("Time, sec");
ylabel("Step Response");
text(0,1.4,'Max Overshoot = 0.08');
text(0,1.2,'Rise Time = 161.10 sec');

% K = 400 subplot
subplot(2,2,2);
plot(t2,r2,[0,500],[0.1,0.1], '-.r',[0,500],[0.9,0.9], '-.r',[0,500],
[1.1,1.1], '-.b');
grid on;
xlim([0 500]);
title("K = 400");
xlabel("Time, sec");
ylabel("Step Response");
text(0,1.4,'Max Overshoot = 7.03');
text(0,1.2,'Rise Time = 76.30 sec');

% K = 1000 subplot
subplot(2,2,3);
plot(t3,r3,[0,500],[0.1,0.1], '-.r',[0,500],[0.9,0.9], '-.r',[0,500],
[1.1,1.1], '-.b');
grid on;
xlim([0 500]);
title("K = 1000");
xlabel("Time, sec");
ylabel("Step Response");
text(0,1.4,'Max Overshoot = 24.54');
text(0,1.2,'Rise Time = 36.17 sec');

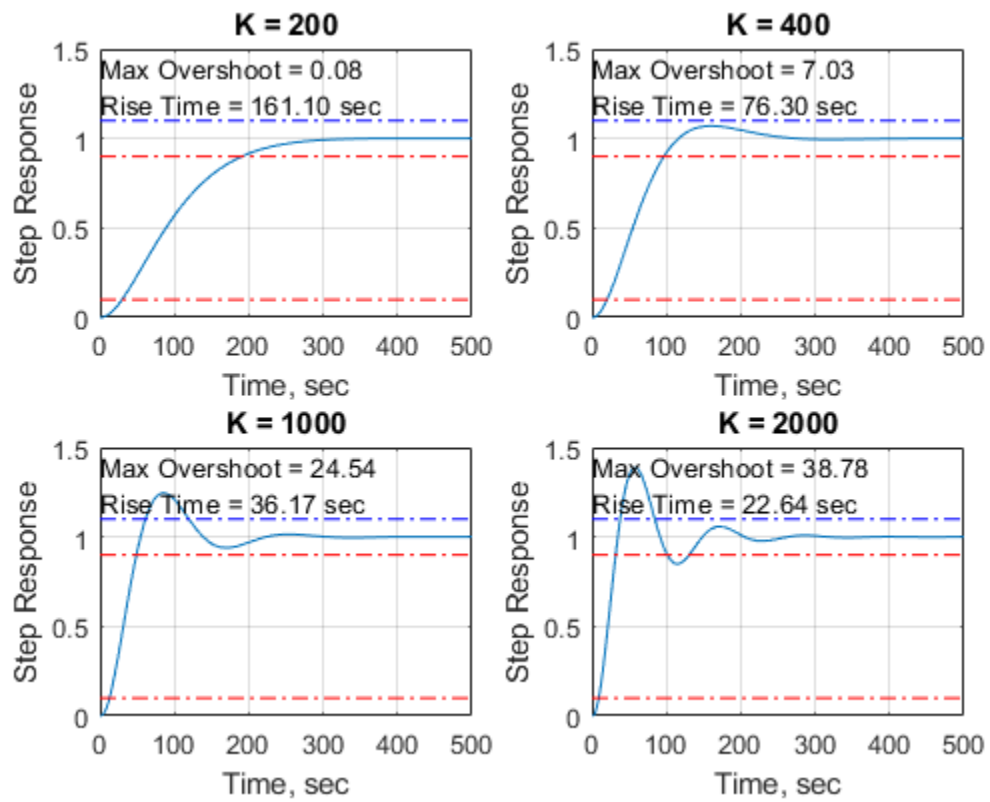
% K = 2000 subplot
subplot(2,2,4);
plot(t4,r4,[0,500],[0.1,0.1], '-.r',[0,500],[0.9,0.9], '-.r',[0,500],
[1.1,1.1], '-.b');
grid on;
xlim([0 500]);
title("K = 2000");
xlabel("Time, sec");
ylabel("Step Response");

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text(0,1.4,'Max Overshoot = 38.78');  
text(0,1.2,'Rise Time = 22.64 sec');
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