```matlab
1 clc;
2 clear;
3
4 %% Q1.3.
5
6 zeta = 0.5;
7 omega_n = 2; % rad/sec
8 z_s = [0.5, 1, 2];
9 Hz0 = tf([omega_n^2/(z_s(0+1)) omega_n^2], [1 ↙
2*zeta*omega_n, omega_n^2]);
10 Hz1 = tf([omega_n^2/(z_s(1+1)) omega_n^2], [1 ↙
2*zeta*omega_n, omega_n^2]);
11 Hz2 = tf([omega_n^2/(z_s(2+1)) omega_n^2], [1 ↙
2*zeta*omega_n, omega_n^2]);
12 Hs = tf([omega_n^2], [1 2*zeta*omega_n, omega_n^2]);
13
14 [yz0, tz0] = step(Hz0);
15 [yz1, tz1] = step(Hz1);
16 [yz2, tz2] = step(Hz2);
17 [ys, ts] = step(Hs);
18
19 fig1 = figure ("Name","Step Response for Different ↙
Zeros",'Position',[100 350 900 500]);
20 hold all
21 plot (tz0, yz0 ,'LineWidth',2,'Color',[0 0.4470 0.7410])
22 plot (tz1, yz1 ,'LineWidth',2,'Color',[0.8500 0.3250 ↙
0.0980])
23 plot (tz2, yz2 ,'LineWidth',2,'Color',[0.9290 0.6940 ↙
0.1250])
24 plot (ts, ys ,'LineWidth',2,'Color',"#7E2F8E")
25
26 title ("Step Response for Different Zeros | Almog Dobrescu ↙
214254252");
27 ylabel("y(t)")
28 xlabel("t [sec]")
```

```matlab
29 grid on
30 grid minor
31 legend({'z = 0.5', 'z = 1', 'z = 2' 'no zeros'},'FontSize',↙
11 ,'Location','northeast')
32 %exportgraphics(fig1, 'q1.3-grap1.png','Resolution',1200);
33
34 %% Q2.
35
36 H1_1 = tf([13], [1 1]);
37 H1_2 = tf([1], [1 4 13]);
38 H1 = H1_1 * H1_2;
39 [yh1, th1] = step(H1);
40
41 H2_1 = tf([13/1.1], [1 1]);
42 H2_2 = tf([1 1.1], [1 4 13]);
43 H2 = H2_1 *H2_2;
44 [yh2, th2] = step(H2);
45
46 H3 = tf([1], [1 1]);
47 [yh3, th3] = step(H3);
48
49 H4 = tf([13], [1 4 13]);
50 [yh4, th4] = step(H4);
51
52 H5_1 = -H2_1;
53 H5_2 = tf([1 -1.1], [1 4 13]);
54 H5 = H5_1 * H5_2;
55 [yh5, th5] = step(H5);
56
57 fig2 = figure ("Name","Step Response for Different↙
Systems",'Position',[100 350 900 500]);
58 hold all
59 plot (th1, yh1 ,'LineWidth',2,'Color',[0 0.4470 0.7410])
60 plot (th2, yh2 ,'LineWidth',2,'Color',[0.8500 0.3250↙
0.0980])
```

```matlab
61 plot (th3, yh3 ,'LineWidth',2,'Color',[0.9290 0.6940↙
0.1250])
62 plot (th4, yh4 ,'LineWidth',2,'Color',"#7E2F8E")
63 plot (th5, yh5 ,'LineWidth',2,'Color',"#4DBEEE")
64
65 title ("Step Response for Different Systems | Almog↙
Dobrescu 214254252");
66 ylabel("y(t)")
67 xlabel("t [sec]")
68 grid on
69 grid minor
70 legend({'H1', 'H2', 'H3', 'H4', 'H5'},'FontSize',11↙
,'Location','southeast')
71 %exportgraphics(fig2, 'q2-grap1.png','Resolution',1200);\
72
73 %%
74 info_h1 = stepinfo(H1, 'SettlingTimeThreshold',↙
0.05,'RiseTimeLimits',[0.1 0.9]);
75 info_h2 = stepinfo(H2, 'SettlingTimeThreshold',↙
0.05,'RiseTimeLimits',[0.1 0.9]);
76 info_h3 = stepinfo(H3, 'SettlingTimeThreshold',↙
0.05,'RiseTimeLimits',[0.1 0.9]);
77 info_h4 = stepinfo(H4, 'SettlingTimeThreshold',↙
0.05,'RiseTimeLimits',[0.1 0.9]);
78 info_h5 = stepinfo(H5, 'SettlingTimeThreshold',↙
0.05,'RiseTimeLimits',[0.1 0.9]);
79
80
```