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% MECH 6300 - HW 7

% Problem 1/2/3
n = 3;
A = [-1 -2 -3;
      0  -1  3;
      1   0 -1];
B = [3; 0; 2];
C = [3  3  0];

syms s

s_I_A_inv = inv(s * eye(n) - A);

charPoly = factor(det(s * eye(n) - A))%, 'FactorMode', 'real')

% Problem 4
syms k1 k2
eq1 = 5 == -4 -3 * k1 -2 * k2;
eq2 = 6 == 11 + k1 + 2 * k2 + 6 * k1 * k2;

[k1,k2] = solve([eq1,eq2],[k1,k2]);
k1 = double(k1(1))
k2 = double(k2(1))

% Problem 5
A = blkdiag([2,1;0,2],[-1,-1]);
B = [0; 1; 1; 1];

% Part a
K = [1 1 1 1]
jordan(A + B*K)
K = [-1 3 5 1]
jordan(A + B*K)

charPoly =

s^3 + 3*s^2 + 6*s + 10

k1 =

-0.1444

k2 =

-4.2834
```

$K =$

1 1 1 1

$ans =$

1.0000	0	0	0
0	-1.0000	0	0
0	0	0.6972	0
0	0	0	4.3028

$K =$

-1 3 5 1

$ans =$

-1.0000	0	0	0
0	9.0713	0	0
0	0	0.6210	0
0	0	0	2.3077

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