بسم الله الرحمن الرحيم

Control System Design: Assignment#4

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Condition Number:

Steady-state gain matrix, $K = \begin{bmatrix} 1 & k_{12} \\ 10 & 1 \end{bmatrix}$.

take $k_{12} = [0.0: 0.2: 1.0]$, and find the Condition number using MATLAB:

by just writing the following script:

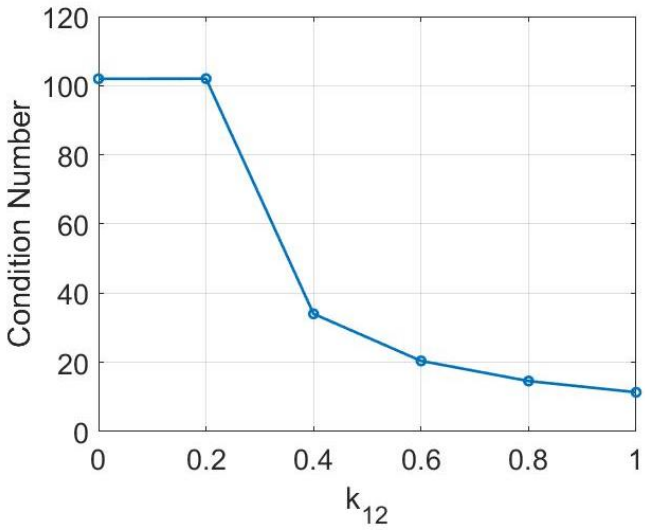
```
close all, clear all, clc

k_12 = [0.0:0.2:1.0];
Cond_no = [];

for i=1:6
    K = [1 k_12(1,i); 10 1];
    [W,S,V] = svd(K);
    Cond_no(1,i) = S(1,1)/S(2,2)
end

plot(k_12, Cond_no), grid on
xlabel('k12'),
ylabel('Condition Number')
```

Then we obtain the following results:

the change of condition number with the change in k_{12}:

k_{12}	Condition number
0.0	101.9902
0.2	102.0302
0.4	34.0239
0.6	20.4230
0.8	14.5943
1.0	11.3564

And also a figure showing this change is ploted:



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