

Assignment 4

A multivariable to defined system is defined as given in Equation (1)

(i) With the aid of MATLAB, find its eigenvalues, and

(ii) Use the eigenvalues to determine its stability

that clearly indicate whether the system is stable or unstable and give atleast a reason for your conclusion

$$\left. \begin{aligned} x_1 - 2x_2 - x_3 + 3x_4 &= 10 \\ 2x_1 + 3x_2 + x_4 &= 8 \\ x_1 - 4x_3 - 2x_4 &= 3 \\ -x_1 + 3x_3 + x_4 &= -7 \end{aligned} \right\}$$

soln

Commandwindow

clear

clc

a = [1 -2 -1 3 ; 2 3 0 1 ; 1 0 -4 -2 ; 0 -1 3 1]

b = [10 ; 8 ; 3 ; -7]

c = inv(a)

d = eig(c)

Commandwindow

c =

0.0267	0.2400	0.4933	0.6667
-0.0963	0.1600	-0.2265	-0.3333
-0.1067	0.0400	0.0267	0.3333
0.2267	0.0400	-0.8007	-0.3333

d =

-0.2821 + 0.2577i,
 -0.2821 - 0.2577i,
 0.2221 + 0.2049i,
 0.2221 - 0.2049i

The system is stable, assuming the system is not stable, the matlab will notify you.