

Indian Institute of Information Technology, Allahabad
Department of Electronics and Communication Engineering

Course Name: Control System Lab

EXPERIMENT NO: 4

DETERMINATION OF Root Locus PLOT USING MATLAB CONTROL SYSTEM TOOLBOX FOR 2ND ORDER SYSTEM & OBTAIN CONTROLLER SPECIFICATION PARAMETERS.

Objective: Write a MATLAB code to obtain a root locus plot for given forward path transfer function.

Root Locus:-

In control theory and stability theory, root locus analysis is a graphical method for examining how the roots of a system change with variation of a certain system parameter, commonly a gain within a feedback system. This is a technique used as a stability criterion in the field of classical control theory developed by Walter R. Evans which can determine stability of the system. The root locus plots the poles of the closed loop transfer function in the complex s -plane as a function of a gain parameter.

Materials Required: MATLAB Software.

MATLAB Code:

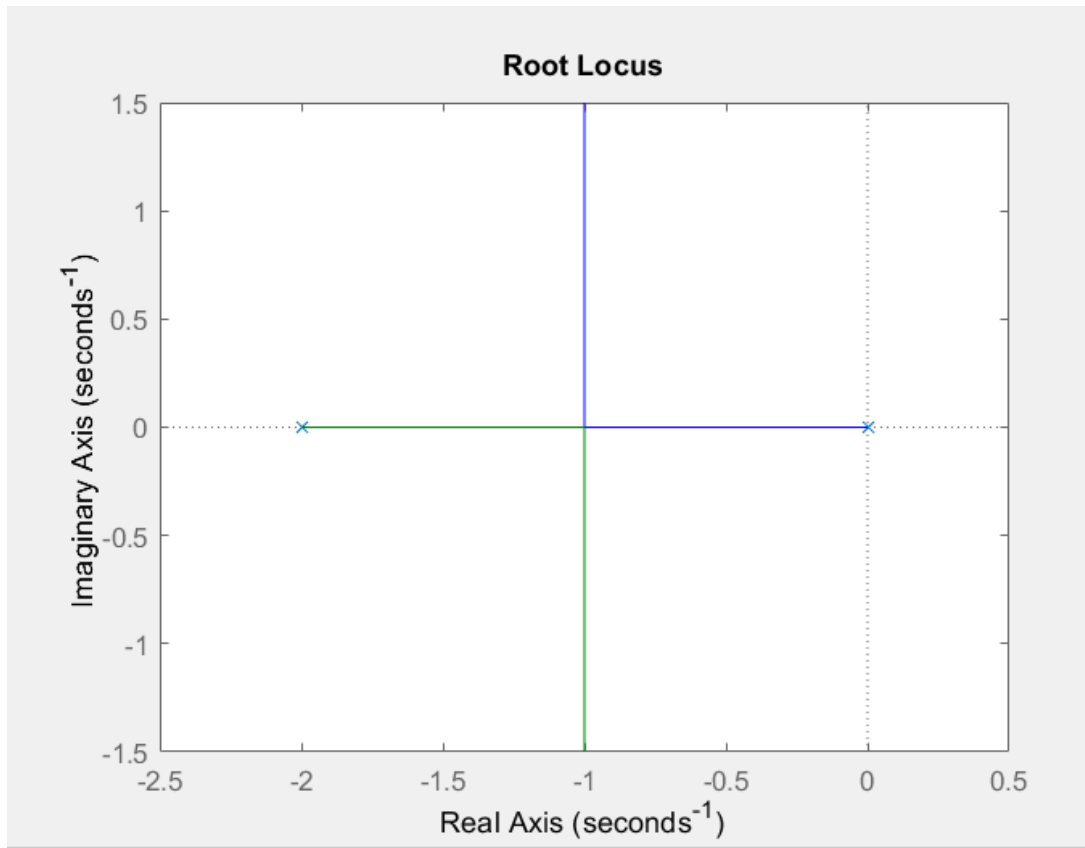
```
1. % Obtain Root Locus Plot of a system having forward
    path transfer function
% of  $G(S) = 1/s(s+2)$ 
clc;
clear all;
close all;
num = [1];
den = poly([0 -2]);
g = tf(num,den) % transfer function
rlocus(g) % for root locus plot
```

Result:-

g =

$$\frac{1}{s^2 + 2s}$$

Continuous-time transfer function.



2.

`%Obtain Root Locus Plot of a system having forward path transfer function`

`% of G(S) = (1+s)/s(0.5s+1)`

`clc;`

`clear all;`

`close all;`

`num = [1 1];`

`den = conv([1 0],[.5 1]);`

`g = tf(num,den)`

rlocus(g)

Result:-

g =

$$\frac{s + 1}{0.5 s^2 + s}$$

Continuous-time transfer function.

