VASA., COLLEGE OF ENGINEERING

(Affiliated to Osmania University)
Hyderabad - 500 031.

DEPARTMENT OF

ECE

NAME OF THE LABORATORY : CSE

Name Grisni Cranga Pranow Roll No. 1602-21-735-117 Page No.

Stability of open loop/closed loop system using nyquist plat

Aim:- To analyse the stability of open loop/closed loop system wing nyquist plot

Ackaratus.

Tools required - A PC loaded with MATLAB

Theory -

Myquist plot is crucial for analyzing the stability of both open loop and closed loop systems. It provides a graphical representation of the systems frequency response

For open-loop systems, the nyquist plot helps determine stability by examining how the system's frequency response behaves as frequency varies. Specifically it allows engineers to evaluate if the system's transfer function encircles the critical point of -1+jo in the complex plane. If it does,

In closed loop systems, the Nyquist plot is used to analyze the stability of the feedback system. By plotting the transfer function of the open loop system and the transfer function of feedback love, engineers can determine stability by checking if the Nyquist plot endoses the critical point if the plot eneircles the critical point in the system is unstable.

```
(i) G(3) = 1
                            (St1)2 (HS)(HS).
        Mag = _ _ =
                                                                           Phase = -27cm (cw)
                           Viteo 2 1 + 102 1 + 102
       At w=0, mag=0, phase= - (80) beads 100 1000 10 dillians?
        Here we have only poles to attitude and situation of their
            =) starting point: dockwise
                                                                                                         curing alyquist plat
          Sph-Eph = 0°- (-(80°) = 180° = tve
                                                                                                                                                     Managhar -
            => Ending point: dockwise
           magnitude stock at 1 and ends at 0
         polar plot:
                    of visitable put programme Inverse polar prot:
                                                                                                                               Heavist July January
                       boths open Loop, and school Loop rystem. of provides
                  -180° W=0
                  For open loop igopping the suggests that 90Pm determine
  N=0 (number of encirclements around (-1,50) is 0)

P=0 , N=P-2 \Rightarrow 2=0

\Rightarrow system is stable since P=0, 2=0.
                                                                                                        the system is contable.
    (Pi) (r(s) = 3
in closed shop systems the magine plat is 178 on to concluse it was the stability of sugar was a sugar of the sug
                 phase; 90-7an-1cw) 90°
                                                                          extend putpet at the plot entiretted
         SP Spa; pole; clockwire
          EPEPh: EP: Sph-Eph = 90°-0°=90° =>+ve
                                                                                                           =) clockwise
```

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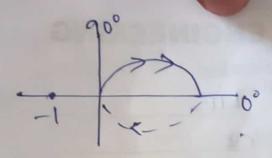
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```
Program;-
   de;
  clear;
                          3 = 8,3 = 4 MIND Alders II WARD C=
  close all;
  S= E # C'S')
                                              (11-20) (1-8) 2
   9= 1/( LSH) (CS+1)
  Ch = feedback (911)
                                                   fully of pl
  nyquist(g)
                                         (15 Expl 17 Ext) w
  figure;
                   Tent ((10) - 27 cm (10) - 7 cm ((10) - 7 cm (210)
  92 = s/cs+1)
  nyquist (92)
                                   PAGE
                                    883-
  cl2 = feedback (921)
                                  270°
  flgure;
 93=(4#8+1)/(3984 (3+1) +(2*8+1))
                                                    111- : 130000
  nyquist (93)
 axis([-20 2 -5 5])
 cl3=feedback (93,1)
                                 as stanting point; cholumine
 figure;
stepplot(g):
                                    Sphitzh = 4x6 +276
 figure;
stepplot (92);
figure;
stepplot (93);
figure :
```



N=no of encirclements around (-1,jo) is 0

(HILMOND OIL) NI D

P=0, \$ =0

=> system & stable since P=0, 9=0

(iii) (513) = 43+1 & (3+1)(23+1)

mag; 51+1602 (1/02+1)

phase: + tani (4 w) - 27 ani (0) _ Tani (2w) _ Tani (2w)

Mag phase $\omega = 0$ ∞ -188 $\omega = 0$ 0 -270°

geroes: -1/4, Poles: -1, -1/2

Zero is nearer to origin => starting point: clockwise

Sph-Eyh = -180°+270° = 90° = + Ve => cluckwse -270°

-180° 5 W=D

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stepplot(cli); figure; stepplot(cl2); figure; stepplot (U3); figure; p=map(g); figure; p=map(92); figure; p2map(93); Result: - Analyzed the open Coop/closed loop system stability using nyquist plot