1 2
2 2
3 3
3.1 3
3.2 4
3.3 6
3.4 9
3.5 12
3.6 14
3.7 19

1

2

$$y(t) = 1 - e_{n} \sin(_{n} : t$$

$$KG(s)H(s) = 1$$

$$LNG(s)H(s) = 18°n2k+1) 18$$

5

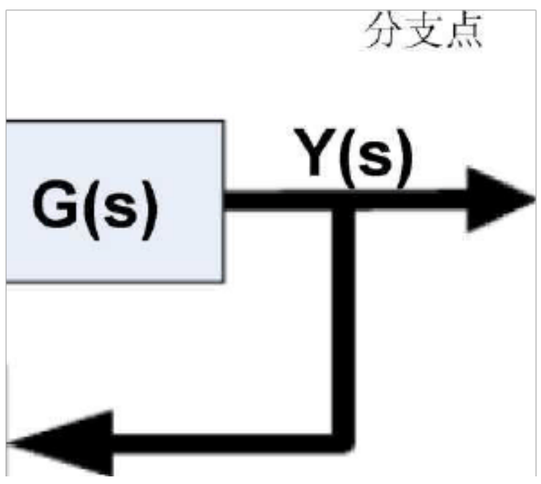
3

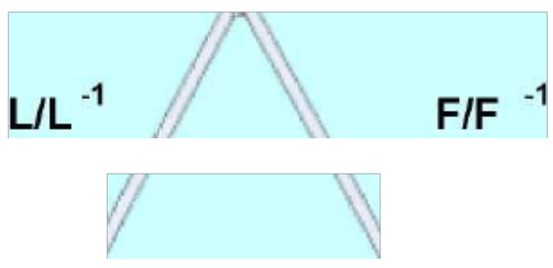
3.1

R（s）　　J

■　　H

（s）





G(s)　　G(jw)

=Ax +Bu sX(s) = AX(s)+BU(s) ; X(s) = (sI - A)

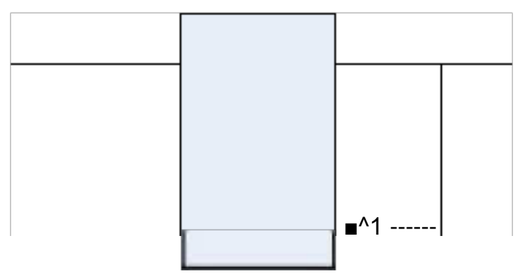
y = Cx + Du Y(s) =CX(s) + DU(s) BU(s)

Y(s) [C(sI A) 1B D] U(s)

1   $a_n S^n - a_{n\_i} S^{n'}$ •   a

3.2

$$\frac{k(s\ z_g)(s \qquad \bullet (s\ zj}{s_N(s\ P_i)(s\ P_2)\ (s\ P_q)}$$



1 y(t) = 1 n s i n £ t)

(S S2 2 • nS n2 \ 1 a r c c o S 1

$$\frac{1}{}$$

$$T_s \quad \zeta\omega_n \quad =100$$

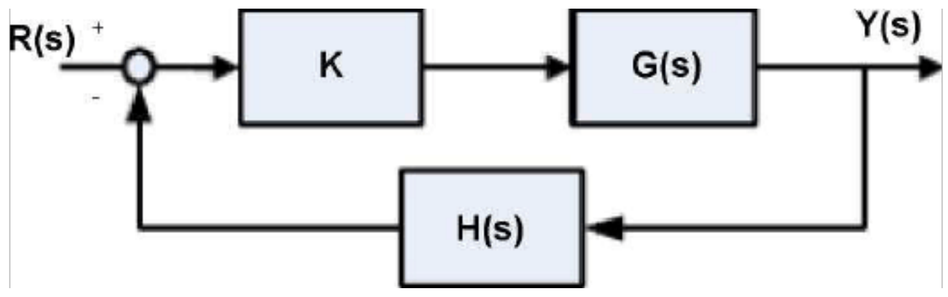
v - arccos

$$K_p = I_s m_o G(s), e_{ss} \qquad \frac{1}{1\ K_p}$$

$$K_v \quad =1\ S m_0 s G(s), e_{ss} \qquad \frac{1}{K_v}$$

$G(s), Q_s$

3.3

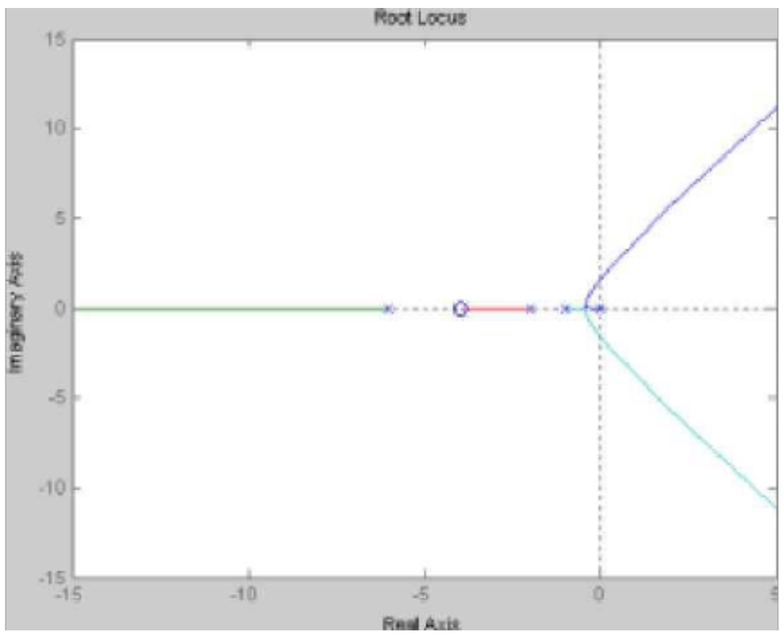


q(s) =1 KG(s)H(s) =0

||KG（s）H （s） =1

lNG（s）H（s）=180”=（2k+1） 180

^8）



$$T_s = \frac{4}{\zeta\omega_n}$$

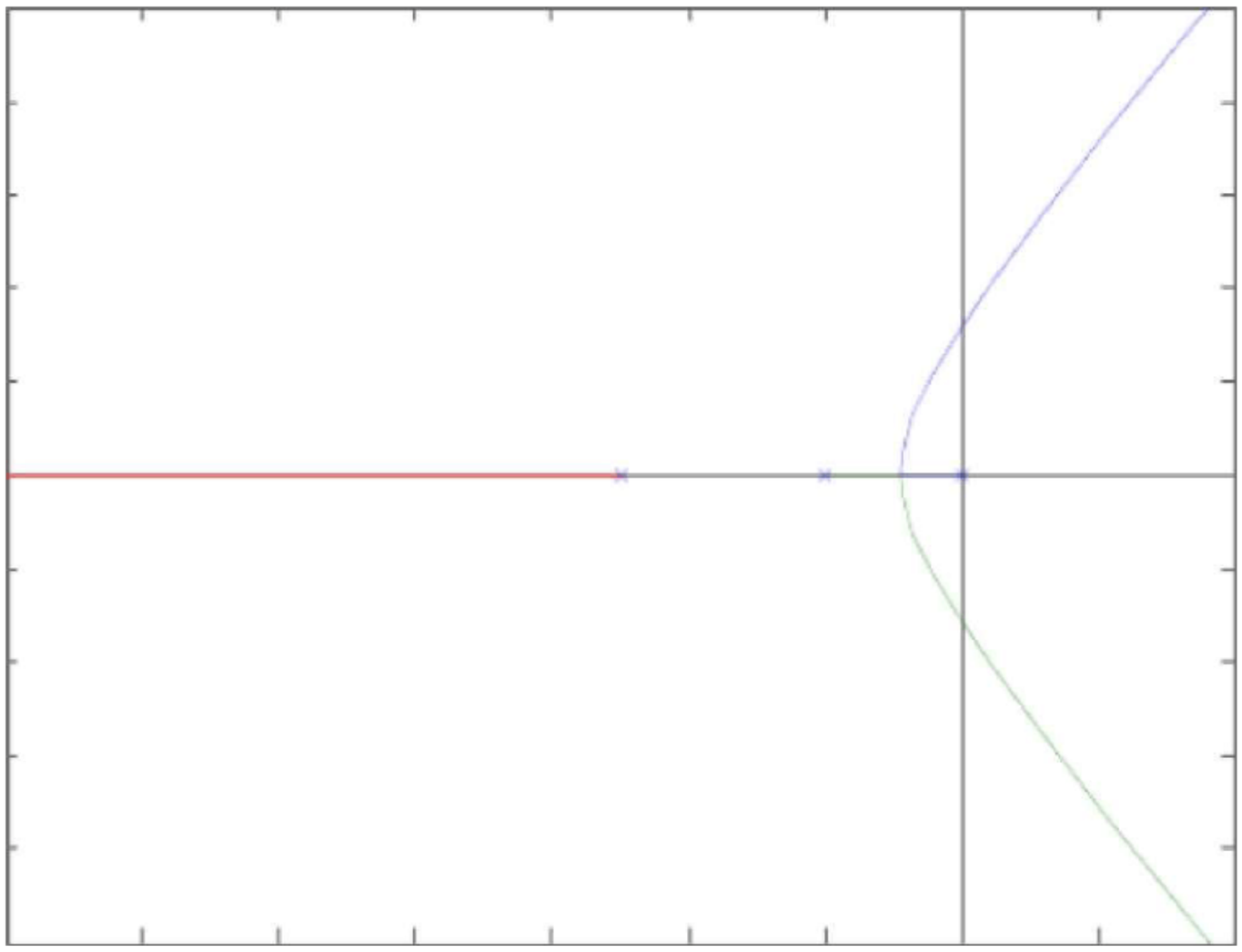
=100 e" 1 %

v - arccos

-14 -12 -10 -8 -6 -4 -2 0 2 4

Real Axis

Root Locus



$$G(s) \quad \frac{K}{s(s\ 2)(s\ 5)}$$

$$\frac{dG}{ds} \quad 0 \quad 3s^2\ 7s\ 10=0 \quad \frac{ds}{ds}$$

$$s_{i,2} \quad \frac{-14 \quad 76}{6} \quad -0.88,-3.78$$

$$\left| \frac{K}{s(s+2)(s+5)} \right|_{s^*.88} \quad =1 \quad K - 4.06$$

$$P(s)=1\ G(s^{\wedge}\ \frac{s^3 +7s^2 +10s + K}{s(s-2)(s-5)} \quad =0$$

$$s = j \quad j^{\ 3} \quad 7^{\ 3} \quad j10 \bullet K =0$$

$$_{3} \quad 10 \quad =0 \quad {}^{*10} \quad , \ \$_{\ 2} = \quad J10$$

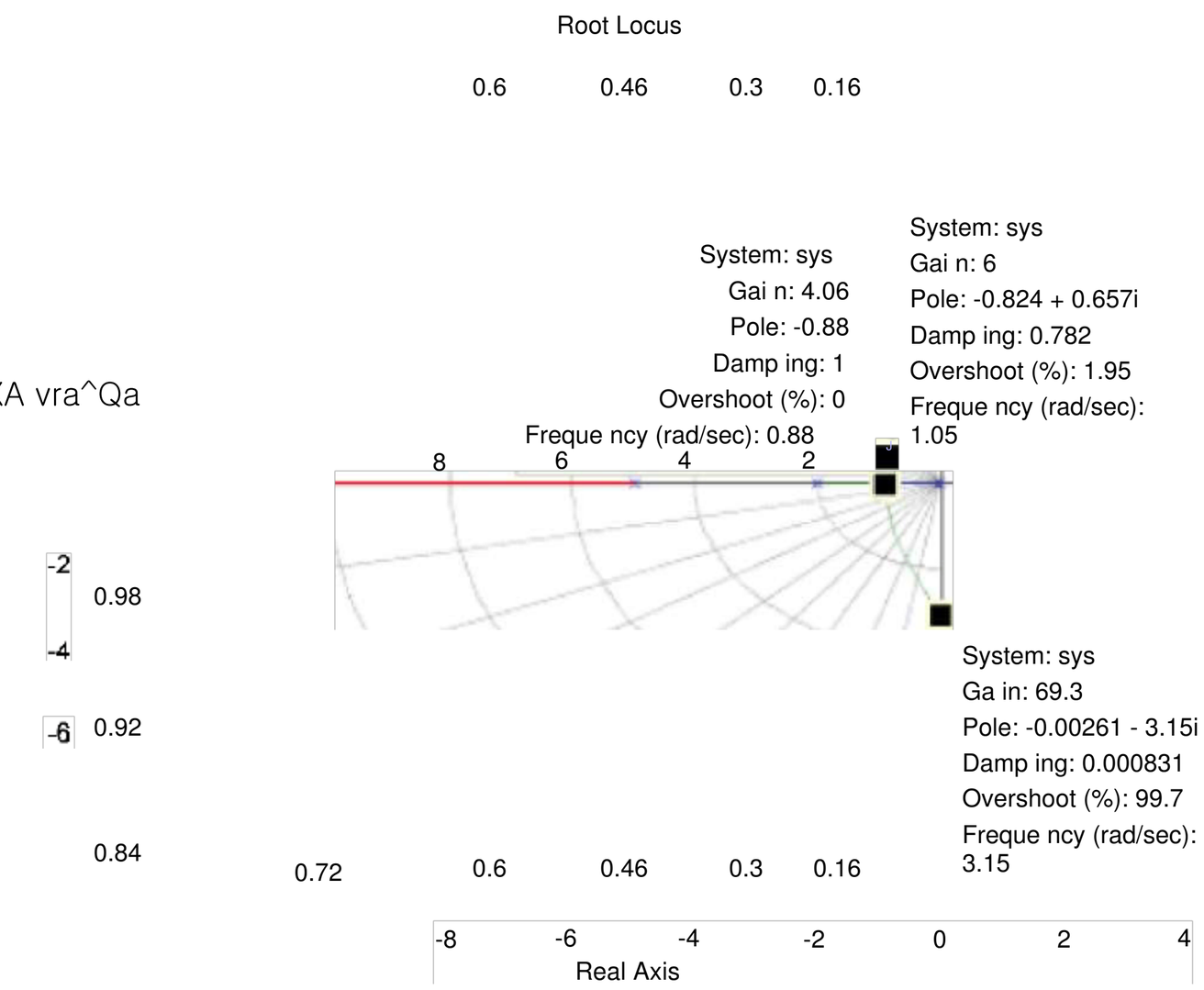
$$_7\ (4)_2^{\ 2} +K =0 \quad K =70$$

$$s^3\ 7s^2 \quad 10s\ 6 = 0$$

$$p\ (s) = S + 7s^2 +10s+6 \quad {}_{s=p}$$

$$s\ 7s^{3} \quad ^{2} \quad 10s\ 6 \quad s\ 5.34)(s^2\ 1.66s\ 1.12)$$

1 2, 3



3.4

G（j，） =G（s）|s”

G（j^） =G（GO）Z

g（co） =arcta n[G（j①）]

G（s）*=G（j K

G(s) G(j)
s

G（s） 1 G（j 1
Ts+1 j T+1