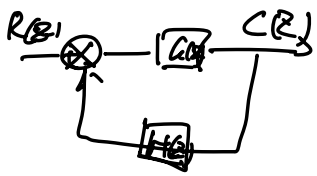
Example 4.8

Q: k range? ω_d = ?

Solution

from (4-3) $\frac{C(z)}{R(z)} = \frac{G(z)}{1+G(z)H(z)}$

(1)

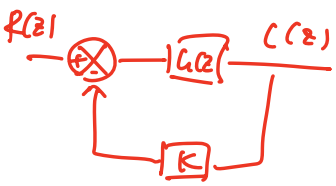


(1) 推导闭环 $G(z) = \frac{C(z)}{R(z) - C(z)H(z)}$

$GR - GCH = C$

$GR = (GH+1)C$

$\frac{C(z)}{R(z)} = \frac{G(z)}{1+G(z)H(z)}$



why H=1 ?

例题是直接默认开环闭环Gz相等然后Hz=1出的答案

你就照这个算啊

纠结这个没啥必要，会算就行了

这个理解不一样很容易有歧义啊

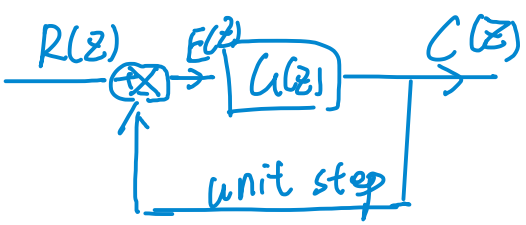
from (1) $\frac{C(z)}{R(z)} = \frac{G(z)}{1+G(z)K} = \frac{\frac{k(0.3679z+0.2642)}{(z-0.3679)(z-1)}}{1+\frac{k(0.3679z+0.2642)}{(z-0.3679)(z-1)}}$

$= \frac{k(0.3679z+0.2642)}{(z-0.3679)(z-1)+k(0.3679z+0.2642)}$

$= \frac{k(0.3679z+0.2642)}{z^2+a_1z+a_2}$

$a_1 = -1.3679 + 0.3679k$

$a_2 = 0.3679 + 0.2642k$



$\frac{C}{R} = \frac{G(R-C)}{R} = G(1-\frac{C}{R})$

$G = \frac{C}{E}$

$= G - G\frac{C}{R}$

$(1+G)\frac{C}{R} = G$

$\frac{C}{R} = \frac{G}{1+G}$

G(1的根点击Jury test

2nd order

$|a_2| = |0.3679 + 0.2642k| < 1 = \alpha_0$ (1)

$P(1) = 1 - 1.3679 + 0.3679k + 0.3679 + 0.2642k > 0$ (2)

$P(-1) = 1 + 1.3679 - 0.3679k + 0.3679 + 0.2642k > 0$ (3)

from(1) $-5.1755 < k < 2.3925$

from(2) $k > 0$

from(3) $0.1037k < 2.7358$

$k < 26.3819$

So $0 < k < 2.3925$

if $k = 2.3925$ $P(4) = 0$ critically stable

$z^2 - 0.4877z + 1 = 0$

$z = 0.2439 \pm j0.9698$

$T = 1$

$wd =$

$z = e^{\frac{-2\pi\zeta}{\sqrt{1-\zeta^2}}\frac{w_d}{w_s}} + e^{j2\pi\frac{w_d}{w_s}}$

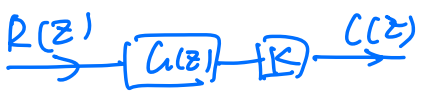
$|z| =$

$\angle z = 2\pi\frac{w_d}{w_s} = w_d T$

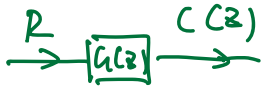
已知相位求 $w_d = \frac{1}{T}\angle z = \frac{1}{T}\tan^{-1}\frac{Img}{Real}$

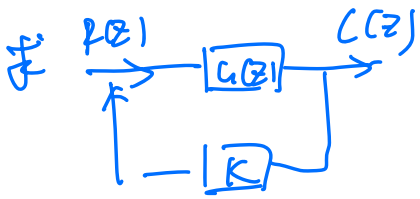
$$\omega_d = \frac{1}{T}\angle z = \angle\beta = \tan^{-1}\frac{0.9608}{0.2439}$$

$$= 1.3244\ rad/sec$$

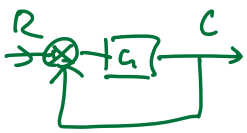


$$G(z) = \frac{KC(z)}{R(z)}$$





$$G(z) = \frac{C(z)}{R(z) - KC(z)}$$



$$C(z) = G(z)R(z) - KG(z)C(z)$$

$$[1 + KG(z)]C(z) = G(z)R(z)$$

$$\frac{C(z)}{R(z)} = \frac{G(z)}{1 + KG(z)}$$

$$G(z) = \frac{C(z)}{R(z)} \qquad G'(z) = \frac{C(z)}{R(z) - C(z)} = \frac{\frac{C(z)}{R(z)}}{1 - \frac{C(z)}{R(z)}}$$

$$\frac{G}{1-G} = \frac{C}{R-C} \qquad = \frac{G(z)}{1 - G(z)} \quad 设为\ H(z) = 1$$

$$G(R - C) = C(1 - G)$$

$$GR - GC = C - CG$$

$$GR = C \qquad \frac{C}{R} = G$$