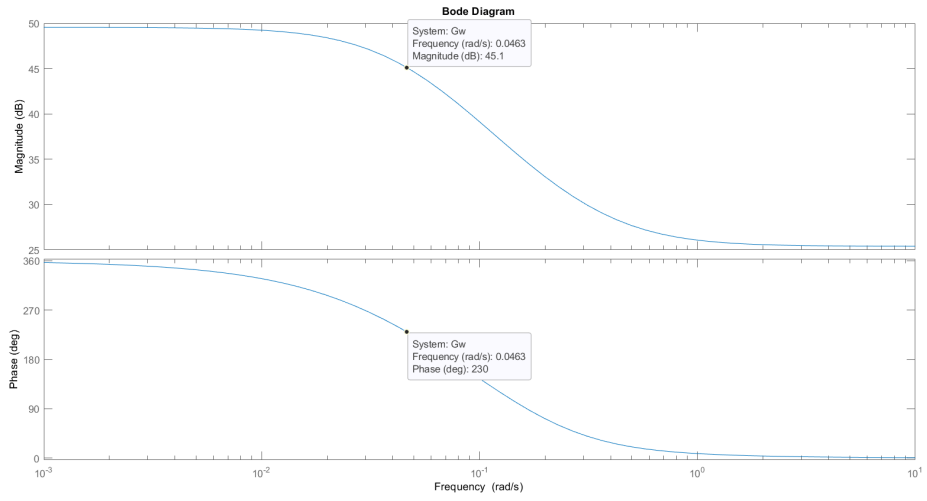
Controle Digital
Prova 2 - Questão 1

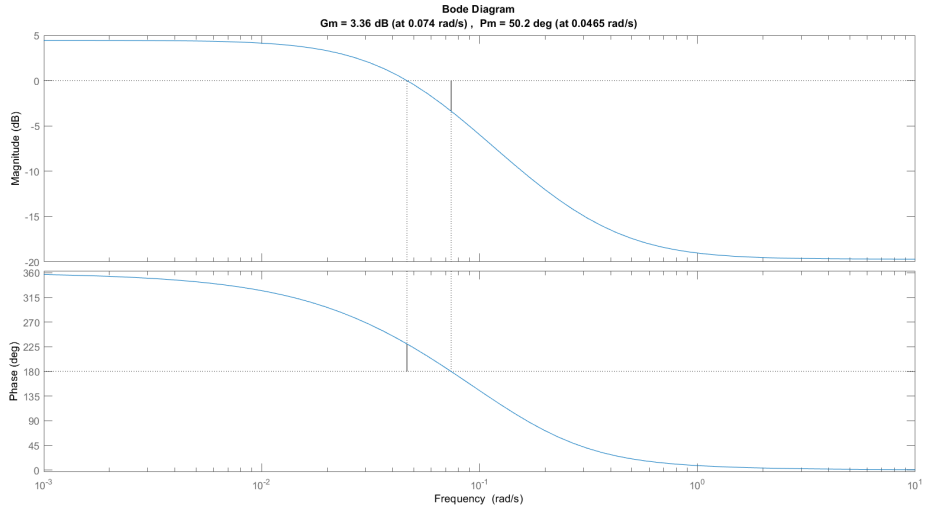
João Viktor de Carvalho Mota - 160127823

1. letra a

```
G1 = tf([300],[250 35 1])
zz = tf([1],[1 0],15)
Gz = c2d(G,15,'zoh')
Gzz = Gz*zz
Gw=d2c(Gzz,'Tustin')
bode(Gw)
c = db2mag(-45.1)
margin(c*Gw)
```

Figure 1. Codigo no Matlab da Questão 1





Input:

$$\frac{\sqrt{(-2.434\,v^2+0.1316)^2+(-18.63\,v^3-1.642\,v)^2}}{\sqrt{(-0.2569\,v^2+0.0004386)^2+(-v^3+0.01976\,v)^2}}=\frac{1}{0.0056}$$

Result:

$$\frac{\sqrt{(0.1316-2.434\,v^2)^2+(-18.63\,v^3-1.642\,v)^2}}{\sqrt{(0.0004386-0.2569\,v^2)^2+(0.01976\,v-v^3)^2}}=178.571$$

Alternate form:

$$\frac{\sqrt{347.077\,v^6+67.1053\,v^4+2.05554\,v^2+0.0173186}}{\sqrt{v^6+0.0264776\,v^4+0.000165105\,v^2+1.9237\times10^{-7}}}=178.571$$

Solutions: Step-by-step solution

$v=-0.0469438$

$v=-0.0950499\,i$

$v=0.0950499\,i$

$v=-0.133456\,i$

$v=0.133456\,i$

$v=0.0469438$

2. letra b

Input interpretation:

$$251.621 \times \frac{\sqrt{(0.0235\,p - 0.0041\,d)^2 + (j \times 0.133)^2}}{0.0235} = 1$$

Result:

$$10\,707.3\sqrt{(0.0235\,p - 0.0041\,d)^2 + 0.017689\,j^2} = 1$$

Geometric figure:

infinite elliptic cylinder

Alternate forms:

$$d^2 - 11.4634\,d\,p + 1052.29\,j^2 + 32.8525\,p^2 = 0.000518889$$

Input:

$$\frac{\sqrt{(-2.434 \times 0.0235^2 + 0.1316)^2 + (-18.63 \times 0.0235^3 - 1.642 \times 0.0235)^2}}{\sqrt{(-0.2569 \times 0.0235^2 + 0.0004386)^2 + (-0.0235^3 + 0.01976 \times 0.0235)^2}}$$

Result: More digits

251.621…