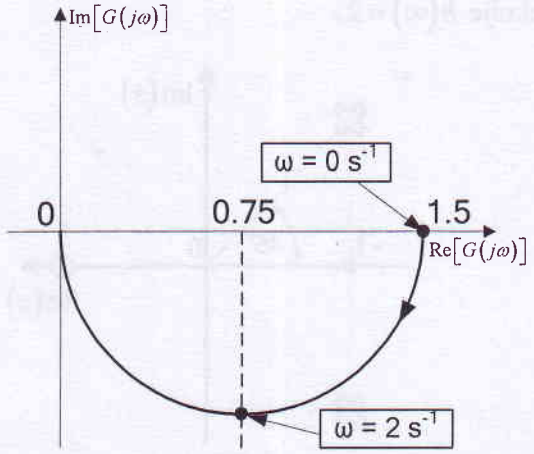
A1

Na slici je zadan Nyquistov dijagram prijenosne funkcije G(s) prvog reda, bez nula.

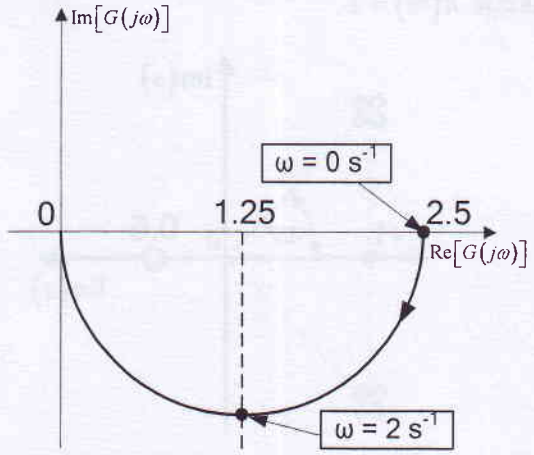


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB\ dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

A2

Na slici je zadan Nyquistov dijagram prijenosne funkcije G(s) prvog reda, bez nula.

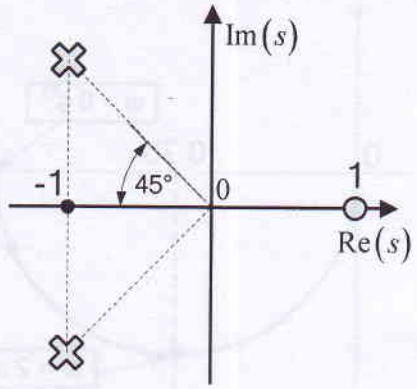


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB\ dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

B1

Na slici je zadan raspored polova i nula prijenosne funkcije G(s) za koju je stacionarno stanje pripadne prijelazne funkcije $h(\infty) = 2$.

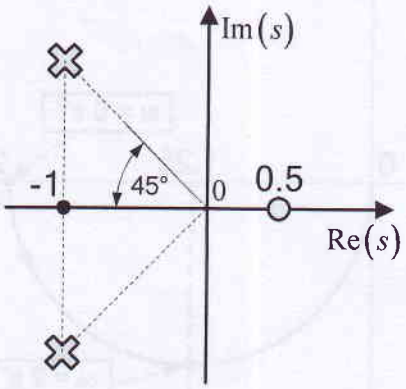


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

B2

Na slici je zadan raspored polova i nula prijenosne funkcije G(s) za koju je stacionarno stanje pripadne prijelazne funkcije $h(\infty) = 2$.

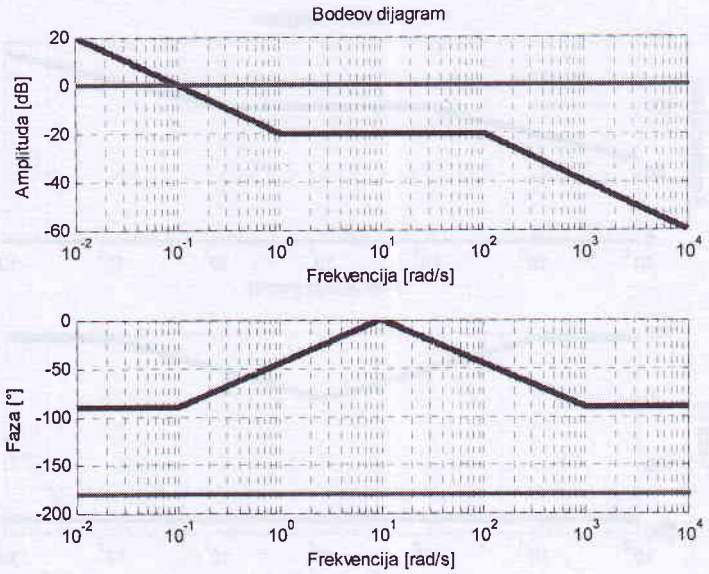


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

C1

Na slici je zadan Bodeov dijagram prijenosne funkcije G(s).

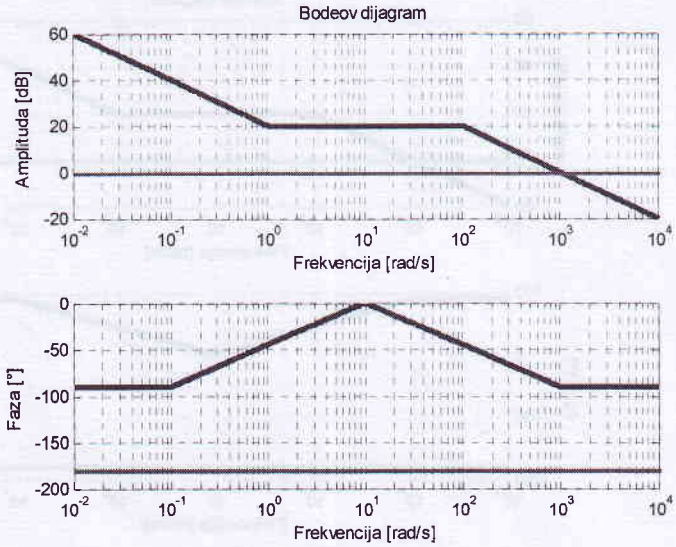


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

C2

Na slici je zadan Bodeov dijagram prijenosne funkcije G(s).

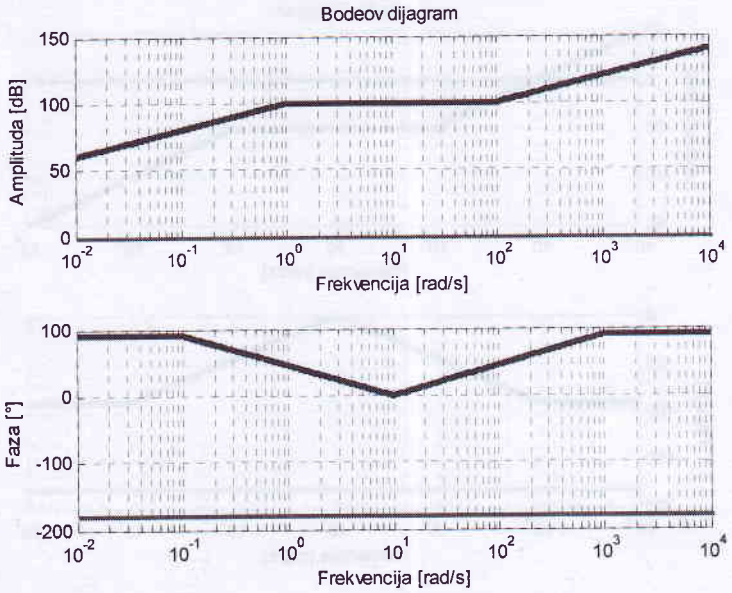


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

D1

Na slici je zadan Bodeov dijagram prijenosne funkcije G(s).

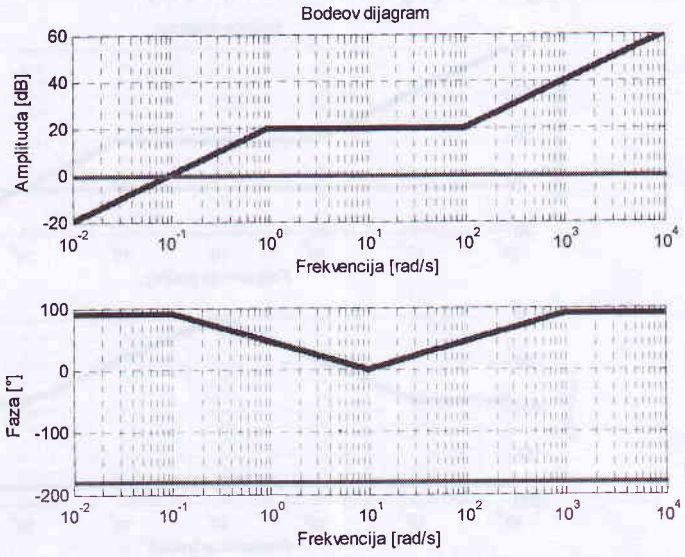


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

D2

Na slici je zadan Bodeov dijagram prijenosne funkcije G(s).

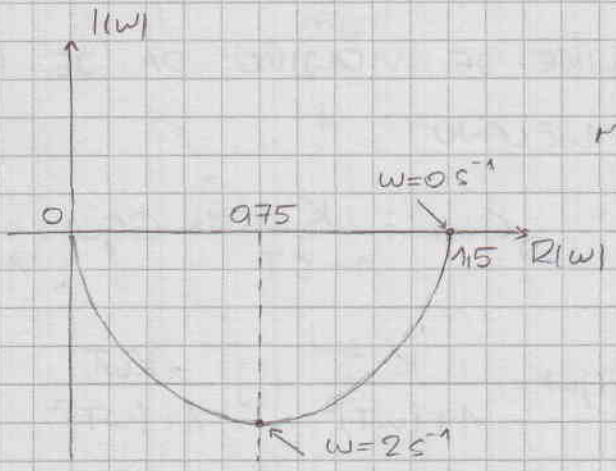


a) Odredite prijenosnu funkciju G(s).

b) Odredite $\varphi(\omega_0)$ i $A(\omega_0)_{dB}$ za prijenosnu funkciju G(s) ako je $\omega_0 = 2\ s^{-1}$.

3. IZLAZNI TEST
GRUPA A1

MARKO GULIN
0036428227
3. AUT 1



IZ OBLIKA DIJAGRAMA ZAKLJUČUJEMO DA SE RADI O PT1-ČLANU

$$G(s) = \frac{K}{1+sT} \rightarrow G(jw) = \frac{K}{1+jwT}$$

$$G(jw) = \underbrace{\frac{K}{1+(wT)^2}}_{R(w)} + j\underbrace{\frac{-KwT}{1+(wT)^2}}_{I(w)}$$

$$R(w=0) = K = 1{,}5$$

$$R(w=2) = \frac{K}{1+4T^2} = 0{,}75 \rightarrow T^2 = \frac{1}{4} \rightarrow T = \pm\frac{1}{2}$$

$$I(w=2) < 0 \rightarrow T > 0 \rightarrow T = \frac{1}{2}$$

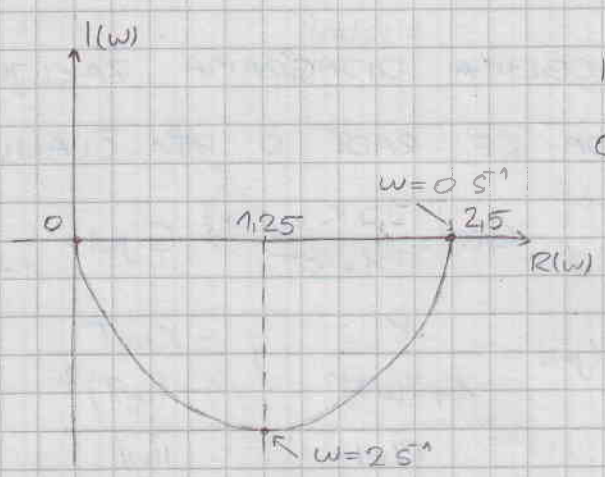
$$G(s) = \frac{3}{2+s} \rightarrow G(jw) = \frac{3}{2+jw}$$

$$A(w) = 20\log 3 - 20\log\sqrt{4+w^2} \rightarrow A(w_0) = 0{,}5115\ dB$$

$$\varphi(w) = \operatorname{arctg}\frac{0}{3} - \operatorname{arctg}\frac{w}{2} \rightarrow \varphi(w_0) = -45^\circ$$

3. IZLAZNI TEST
GRUPA A2

MARKO GULIN
0036428227
3.AUT 1



IZ SLIKE JE VIDLJIVO DA JE RIJEČ O PT1-ČLANU

$$G(s) = \frac{K}{1+sT} \rightarrow G(j\omega) = \frac{K}{1+j\omega T}$$

$$G(j\omega) = \frac{K}{1+(\omega T)^2} + j\,\frac{-K\omega T}{1+(\omega T)^2}$$

$$R(\omega=0) = K = 2{,}5$$

$$R(\omega=2) = \frac{2{,}5}{1+4T^2} = 1{,}25 \rightarrow T^2 = \frac{1}{4} \rightarrow T = \pm\frac{1}{2}$$

$$I(\omega=2) < 0 \rightarrow T > 0 \rightarrow T = \frac{1}{2}$$

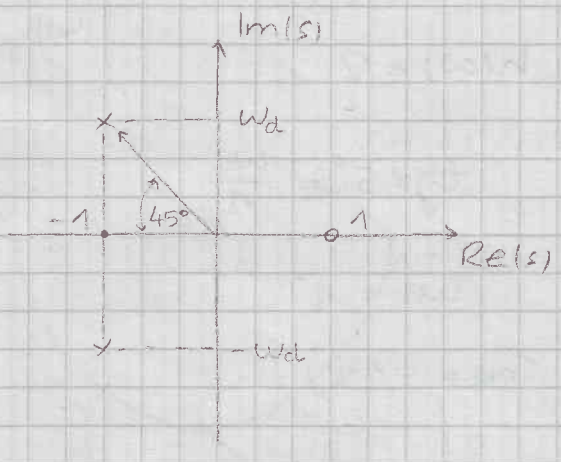
$$G(s) = \frac{5}{2+s} \rightarrow G(j\omega) = \frac{5}{2+j\omega}$$

$$A(\omega) = 20\log 5 - 20\log\sqrt{4+\omega^2} \rightarrow A(\omega_0) = 4{,}948\ \text{dB}$$

$$\varphi(\omega) = \operatorname{arctg}\frac{0}{5} - \operatorname{arctg}\frac{\omega}{2} \rightarrow \varphi(\omega_0) = -45^\circ$$

IZLAZNI TEST
GRUPA B1

MARKO GULIN
0036428227
3. AUT 1



$$h(\infty) = 2 \rightarrow K = 2$$

$$tg\,45^\circ = \frac{\omega_d}{1} \rightarrow \omega_d = 1\,s^{-1}$$

$$s_{p1,2} = -1 \pm j$$

$$G(s) = K\,\frac{s - s_N}{(s - s_{p1})(s - s_{p2})}$$

$$G(s) = (-4)\,\frac{s-1}{s^2+2s+2} \rightarrow G(j\omega) = (-4)\,\frac{j\omega - 1}{2 - \omega^2 + 2j\omega}$$

$$A(\omega) = 20\log 4 + 20\log\sqrt{1+\omega^2} - 20\log\sqrt{(2-\omega^2)^2 + (2\omega)^2}$$

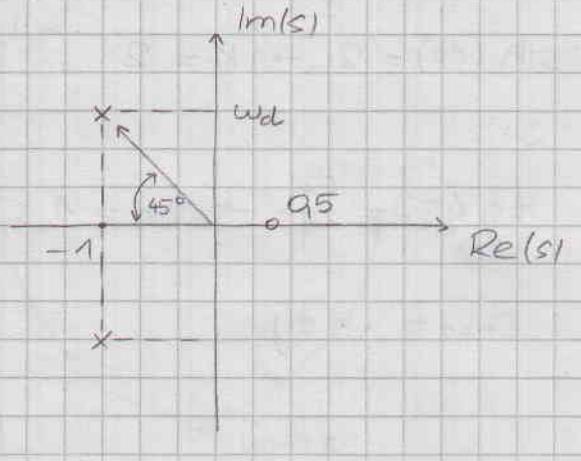
$$A(\omega_0) = 5.97\ dB$$

$$\varphi(\omega) = \operatorname{arctg}\frac{0}{-4} + \operatorname{arctg}\frac{\omega}{-1} - \operatorname{arctg}\frac{2\omega}{2-\omega^2}$$

$$\varphi(\omega_0) = 180^\circ$$

3. IZLAZNI TEST
GRUPA B2

MARKO GULIN
0036428227
3. AUT 1



$$h(\infty) = 2$$

$$tg\,45^\circ = \frac{\omega_d}{1}$$

$$\omega_d = 1$$

$$s_{P1,2} = -1 \pm j$$

$$G(s) = K\,\frac{s - s_N}{(s - s_{P1})(s - s_{P2})}$$

$$G(s) = (-8)\,\frac{s - 0{,}5}{s^2 + 2s + 2} \rightarrow G(j\omega) = (-8)\,\frac{j\omega - 95}{2 - \omega^2 + 2j\omega}$$

$$A(\omega) = 20\log 8 + 20\log\sqrt{0{,}25 + \omega^2} - 20\log\sqrt{(2-\omega^2)^2 + (2\omega)^2}$$

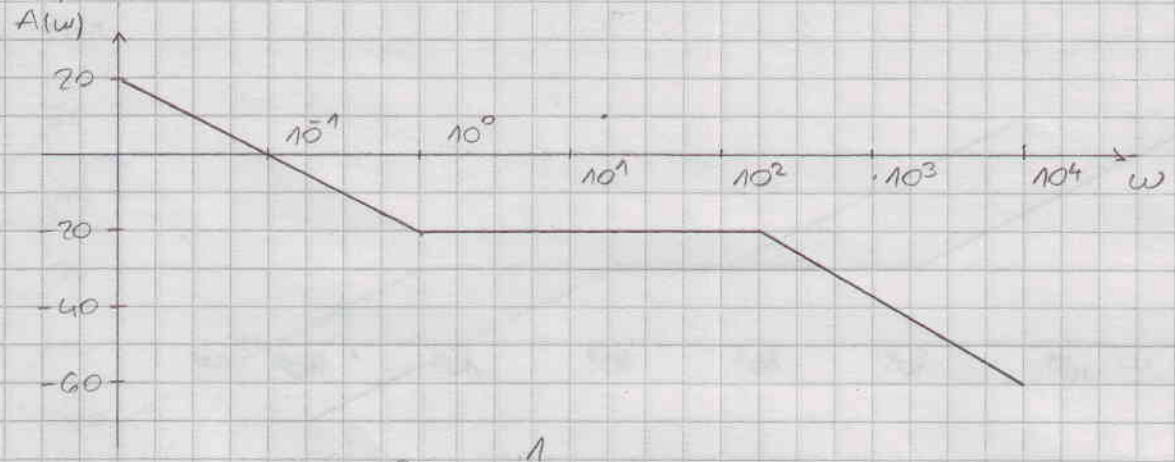
$$A(\omega_0) = 11.3\ dB$$

$$\varphi(\omega) = \operatorname{arctg}\frac{0}{-8} + \operatorname{arctg}\frac{\omega}{-95} - \operatorname{arctg}\frac{2\omega}{2-\omega^2}$$

$$\varphi(\omega_0) = 168^\circ$$

3. IZLAZNI TEST
GRUPA C1

MARKO GULIN
0036428227
3.AUT1

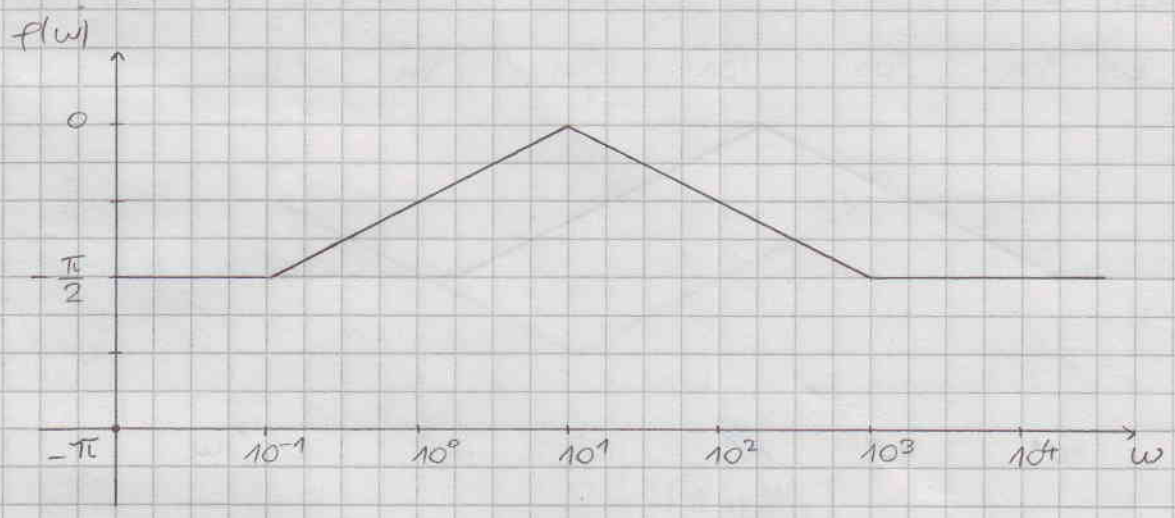


DO $w=10^0$: $\frac{1}{\pm\frac{w}{10^{-1}}}$

OD $w=10^0$ DO $w=10^2$: $\frac{1}{\pm\frac{w}{10^{-1}}}$, $1\pm\frac{w}{1}$

OD $w=10^2$ DO $w=\dots$: $\frac{1}{\pm\frac{w}{10^{-1}}}$, $1\pm\frac{w}{1}$, $\frac{1}{1\pm\frac{w}{100}}$

NA TEMELJU FAZNE KARAKTERISTIKE ZAKLJUČUJEMO O PREDZNACIMA



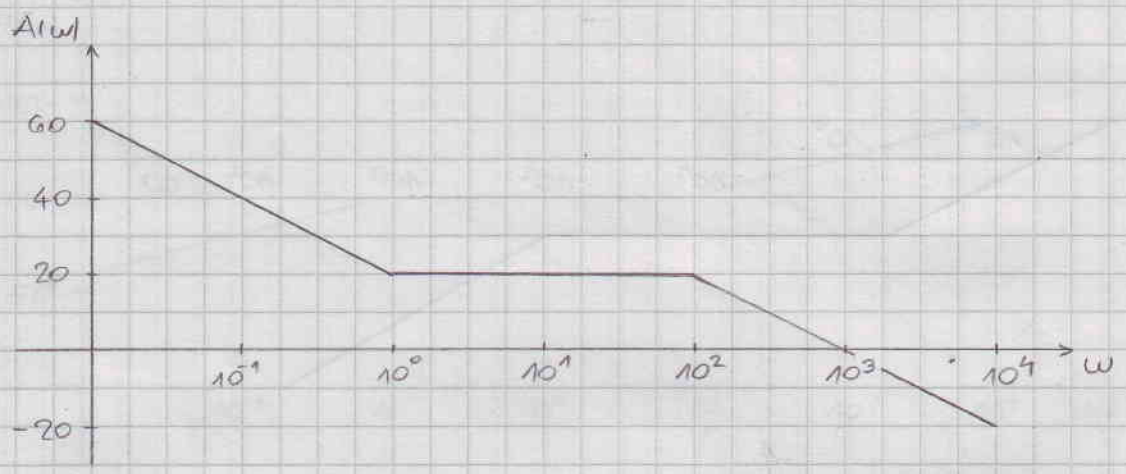
$$G(jw)=\frac{1+j\frac{w}{1}}{+j\frac{w}{10^{-1}}\left(1+j\frac{w}{100}\right)}$$

$$G(s)=10\,\frac{1+s}{s(100+s)}$$

$A(w_0)=-20\,dB$, $\varphi(w_0)=-27{,}7^\circ$

3. IZLAZNI TEST
GRUPA C2

MARKO GULIN
0036428227
3. AUT 1

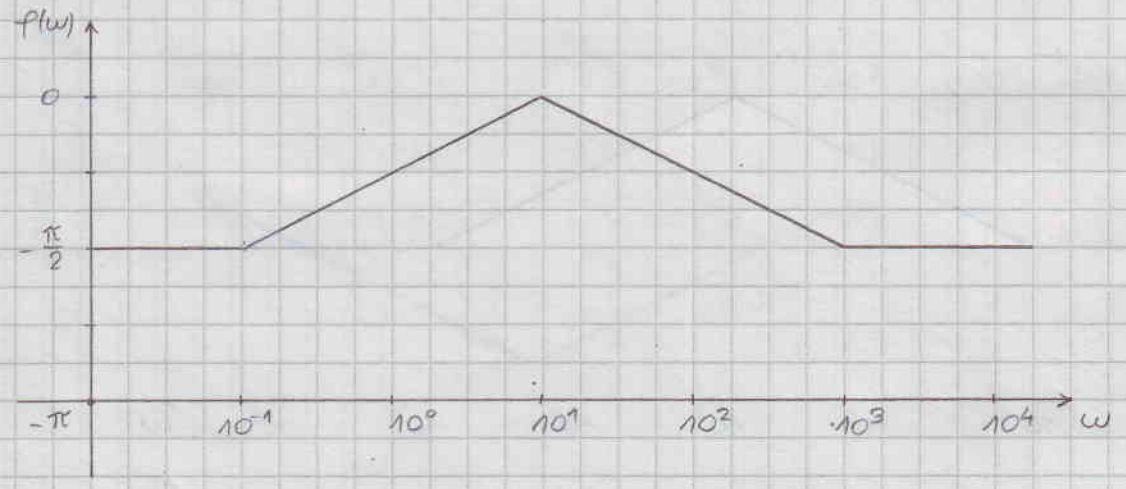


DO $\omega = 10^0$: $\pm \frac{1}{\frac{\omega}{10^1}}$

OD $\omega = 10^0$ DO $\omega = 10^2$: $\pm \frac{1}{\frac{\omega}{10^1}}$, $1 \pm \frac{\omega}{1}$

OD $\omega = 10^2$ DO $\omega = \ldots$: $\pm \frac{1}{\frac{\omega}{10^1}}$, $1 \pm \frac{\omega}{1}$, $\frac{1}{1 \pm \frac{\omega}{100}}$

NA TEMELJU FAZNE KARAKTERISTIKE ZAKLJUČUJEMO O PREDZNACIMA



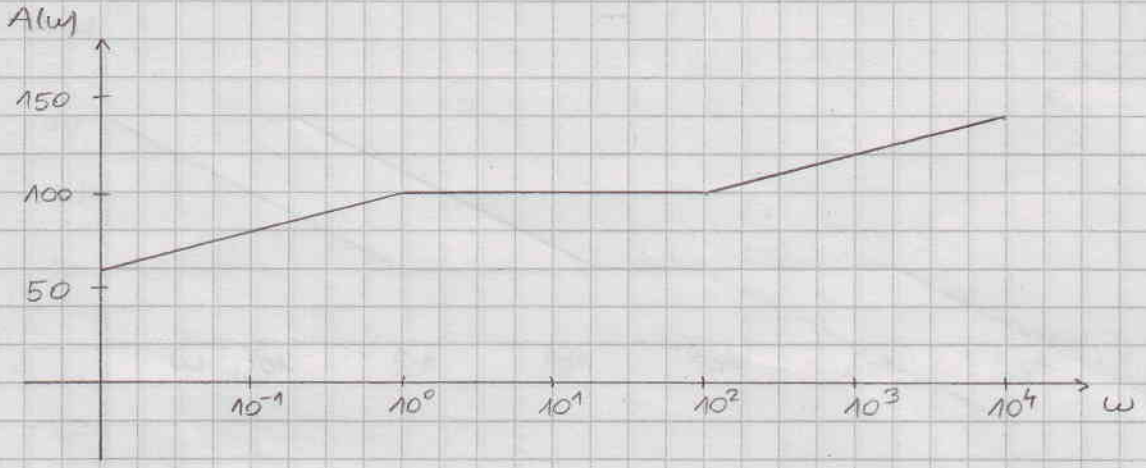
$$G(j\omega) = \frac{1 + j\frac{\omega}{1}}{j\frac{\omega}{10^1}\left(1 + j\frac{\omega}{100}\right)}$$

$$G(s) = 1000\,\frac{1+s}{s(100+s)}$$

$$A(\omega_0) = +20\,dB, \quad \varphi(\omega_0) = -27{,}7^\circ$$

3. IZLAZNI TEST
GRUPA D1

MARKO GULIN
0036428227
3.AUT1



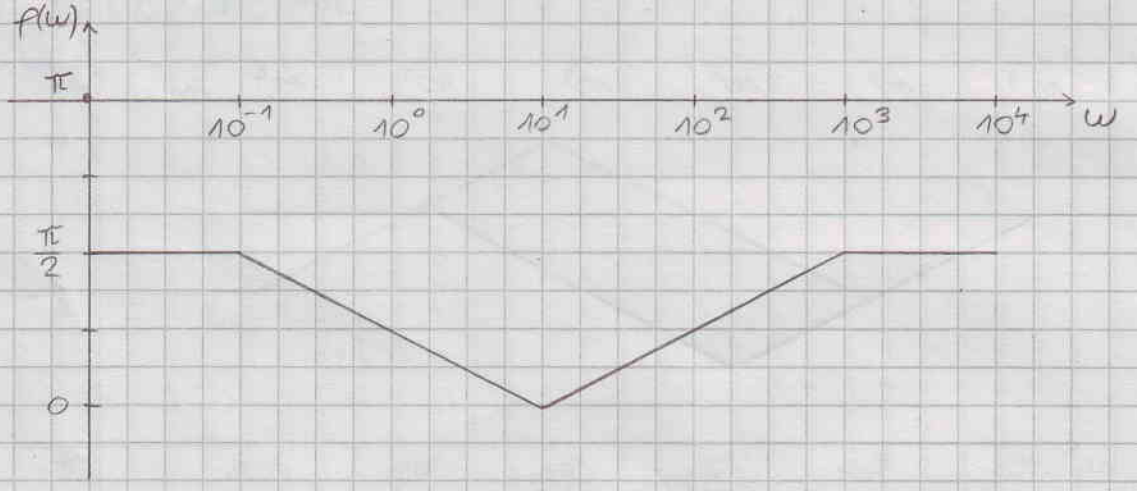
DO $\omega = 10^0$: $\pm \frac{\omega}{10^{-5}}$

OD $\omega = 10^0$ DO $\omega = 10^2$: $\pm \frac{\omega}{10^{-5}}$, $\frac{1}{1 \pm \frac{\omega}{1}}$

OD $\omega = 10^2$ DO $\omega = \ldots$: $\pm \frac{\omega}{10^{-5}}$, $\frac{1}{1 \pm \frac{\omega}{1}}$, $1 \pm \frac{\omega}{100}$

NA TEMELJU FAZNE KARAKTERISTIKE ZAKLJUČUJEMO

0 PREDZNACIMA



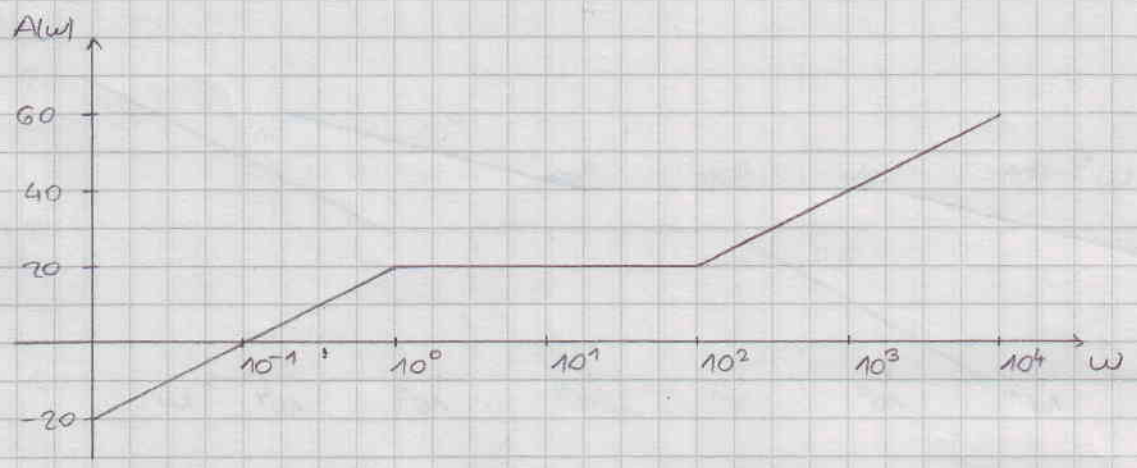
$$G(j\omega) = \frac{j\frac{\omega}{10^{-5}}\left(1 + j\frac{\omega}{100}\right)}{1 + j\frac{\omega}{1}}$$

$$G(s) = 1000\,\frac{s(100+s)}{1+s}$$

$A(\omega_0) = 100\,dB$, $\varphi(\omega_0) = 27{,}8^\circ$

3. IZLAZNI TEST
GRUPA D2

MARKO GULIN
0036428227
3.AUT1

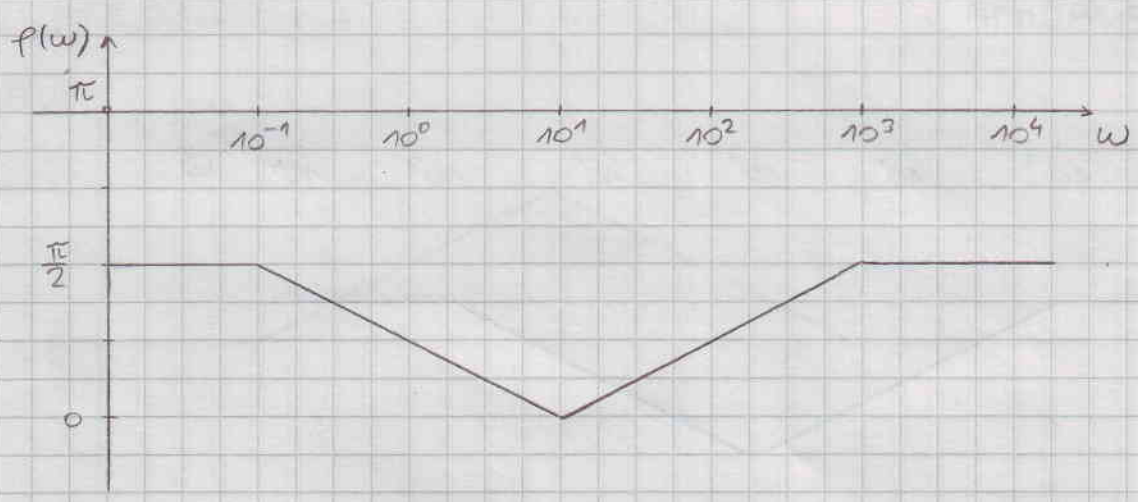


DO $\omega = 10^0$: $\pm \frac{\omega}{10^{-1}}$

OD $\omega = 10^0$ DO $\omega = 10^2$: $\pm \frac{\omega}{10^{-1}}$, $\frac{1}{1 \pm \frac{\omega}{1}}$

OD $\omega = 10^2$ DO $\omega = \dots$: $\pm \frac{\omega}{10^{-1}}$, $\frac{1}{1 \pm \frac{\omega}{1}}$, $1 \pm \frac{\omega}{100}$

NA TEMELJU FAZNE KARAKTERISTIKE ZAKLJUČUJEMO O PREDZNACIMA



$$G(j\omega) = \frac{+j\frac{\omega}{10^{-1}}\left(1 + j\frac{\omega}{100}\right)}{\left(1 + j\frac{\omega}{1}\right)}$$

$$G(s) = \frac{1}{10} \cdot \frac{s(100+s)}{(1+s)}$$

$$A(\omega_0) = +20\,dB, \quad \varphi(\omega_0) = 27.7^\circ$$