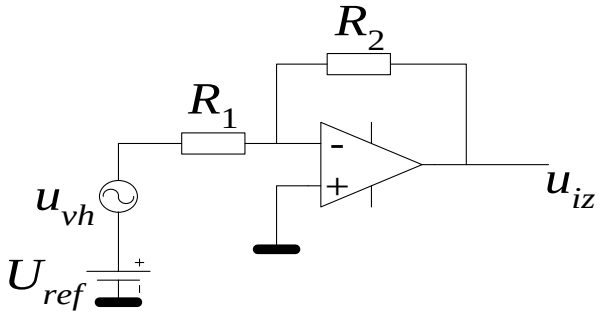
Komunikacijska elektronika

Vezja z operacijskim ojačevalnikom

1.

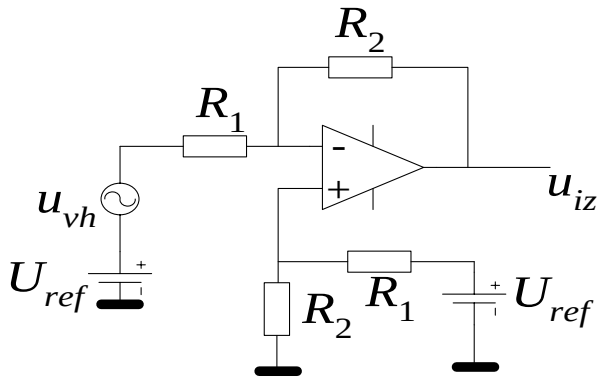
Določi u_{iz}, ter narišite prenosno funkcijo vezja.



$$u_{iz} = -(u_{vh} + U_{ref})\frac{R_2}{R_1}$$

2.

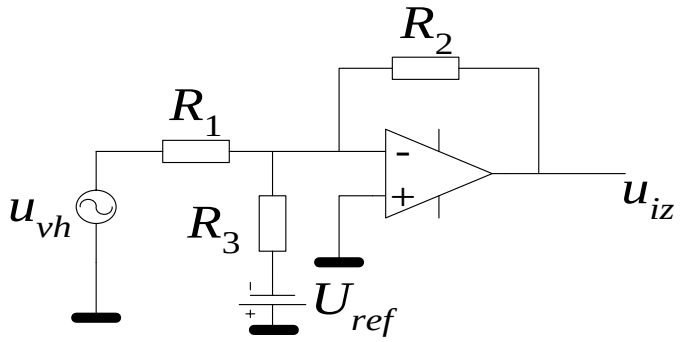
Določi u_{iz}, ter narišite prenosno funkcijo vezja.



$$u_{iz} = -(u_{vh} + U_{ref})\frac{R_2}{R_1} + U_{ref}\left(\frac{R_2}{R_1 + R_2}\right)\left(1 + \frac{R_2}{R_1}\right) = -u_{vh}\frac{R_2}{R_1}$$

3.

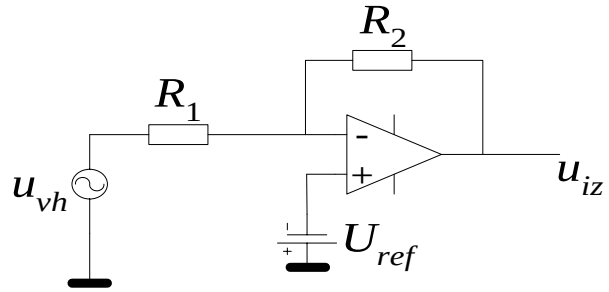
Določi u_{iz}, ter narišite prenosno funkcijo vezja.



$$u_{iz} = -u_{vh}\frac{R_2}{R_1} + U_{ref}\frac{R_2}{R_3}$$

4.

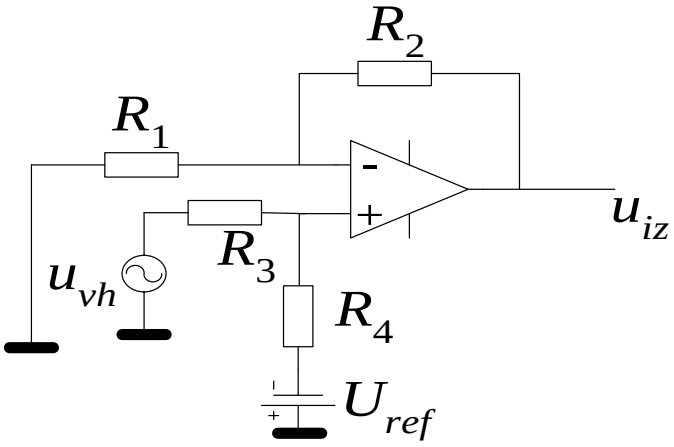
Določi u_{iz}, ter narišite prenosno funkcijo vezja.



$$u_{iz} = -u_{vh}\frac{R_2}{R_1} - U_{ref}\left(1 + \frac{R_2}{R_1}\right)$$

5.

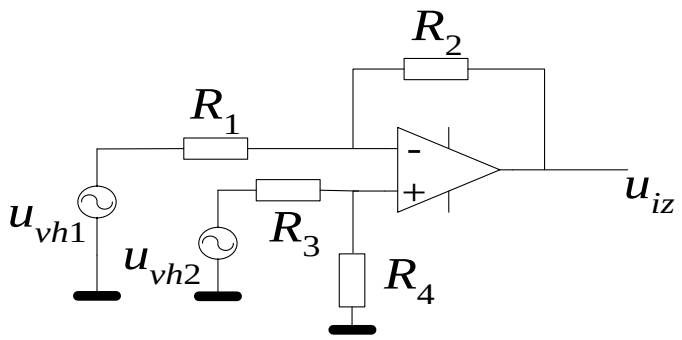
Določi u_{iz}, ter narišite prenosno funkcijo vezja.



$$u_{iz} = -u_{vh}\left(\frac{R_4}{R_3+R_4}\right)\left(1+\frac{R_2}{R_1}\right) - U_{ref}\left(\frac{R_3}{R_3+R_4}\right)\left(1+\frac{R_2}{R_1}\right)$$

6.

Določi u_{iz}, ter narišite prenosno funkcijo vezja.



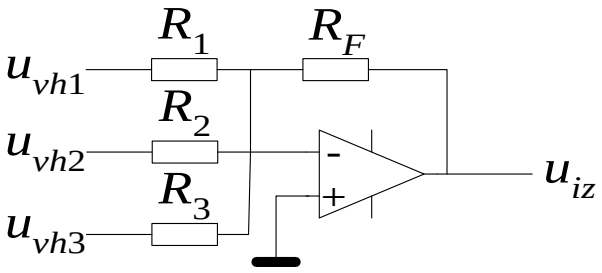
$$u_{iz} = u_{vh2}\left(\frac{R_4}{R_3+R_4}\right)\left(1+\frac{R_2}{R_1}\right) - u_{vh1}\frac{R_2}{R_1}$$

če $R_4 = R_2, R_3 = R_1$

$$u_{iz} = (u_{vh2} - u_{vh1})\frac{R_2}{R_1}$$

7.

Določite funkcijo vezja.



$$u_{iz1} = -u_{vh1}\frac{R_F}{R_1},\ u_{iz2} = -u_{vh2}\frac{R_F}{R_2},\ u_{iz3} = -u_{vh3}\frac{R_F}{R_3}$$

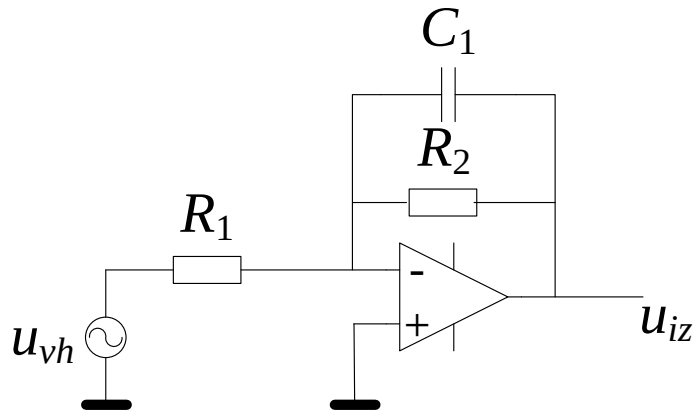
$$u_{iz} = -\left(u_{vh1}\frac{R_F}{R_1} + u_{vh2}\frac{R_F}{R_2} + u_{vh3}\frac{R_F}{R_3}\right)$$

Elektronika TK – 1.del

Vezja z operacijskim ojačevalnikom

8.

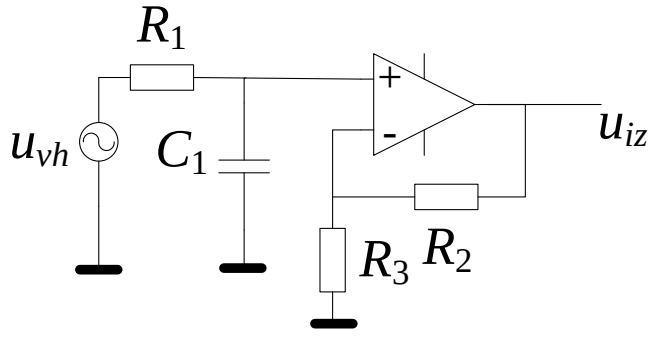
Za invertirajoče nizko sito prvega reda določite izraz za napetostno ojačanje ter narišite Bodejev diagram.



$$\frac{u_{iz}}{u_{vh}} = \frac{-\frac{R_2}{R_1}}{1 + j\omega R_2 C_1}$$

9.

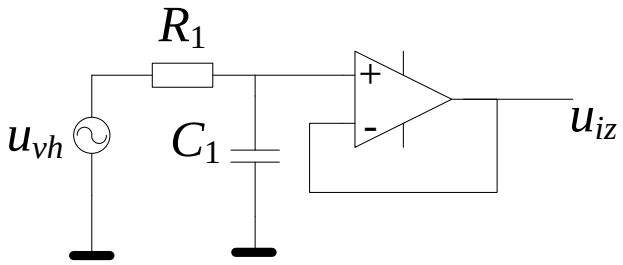
Za neinvertirajoče nizko sito prvega reda določite izraz za napetostno ojačanje ter narišite Bodejev diagram.



$$\frac{u_{iz}}{u_{vh}} = \frac{1 + \frac{R_2}{R_3}}{1 + j\omega R_1 C_1}$$

10.

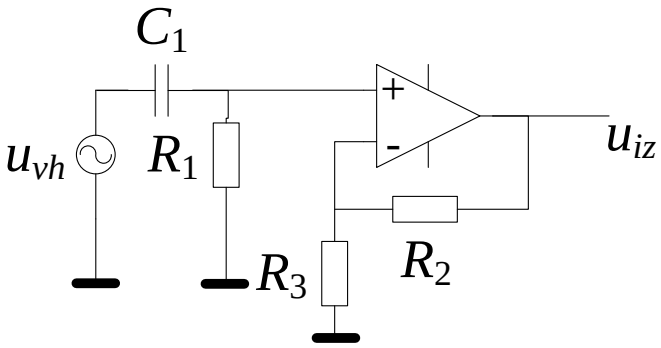
Za nizko sito filter prvega reda na sliki določi R_1, da bo f_c =1 kHz. C = 47 nF.



$$R_1 = \frac{1}{2\pi f_c C_1} = \frac{1}{2\pi \cdot 10^3 Hz \cdot 47 \cdot 10^{-9} F} = 3.38 k\Omega$$

11.

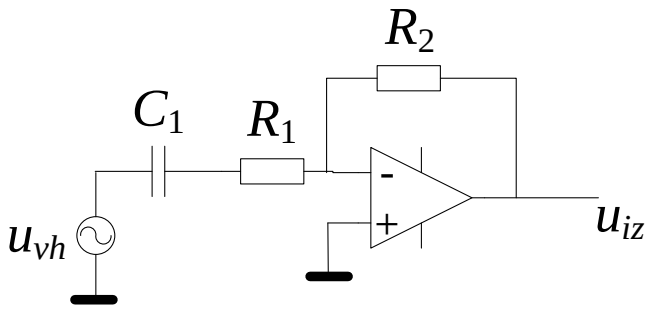
Za neinvertirajoče visoko sito prvega reda določite izraz za napetostno ojačanje ter narišite Bodejev diagram.



$$\frac{u_{iz}}{u_{vh}} = \frac{1+\frac{R_2}{R_3}}{1+\frac{1}{j\omega\ R_1 C_1}}$$

12.

Za invertirajoče nizko sito prvega reda določite izraz za napetostno ojačanje ter narišite Bodejev diagram.



$$\frac{u_{iz}}{u_{vh}} = \frac{\frac{R_2}{R_1}}{1 + \frac{1}{j\omega R_1 C_1}}$$