



UNIVERZITET U NOVOM SADU
FAKULTET TEHNIČKIH NAUKA
KATEDRA ZA RAČUNARSKU TEHNIKU I RAČUNARSKE
KOMUNIKACIJE



Naziv predmeta:

Osnovi Algoritama i Struktura DSP 2

Projektni zadatak 1

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Izveštaj

Zadatak 1):

$$A_1(z) = \frac{\alpha - z^{-1}}{1 - \alpha z^{-1}}$$

$$A_2(z) = \frac{\alpha - \beta(1+\alpha)z^{-1} + z^{-2}}{1 - \beta(1+\alpha)z^{-1} + \alpha z^{-2}}$$

LP shelving filter (za $\alpha = 0.3$):

coefficients = {9830, -32768, 32767, -9830}

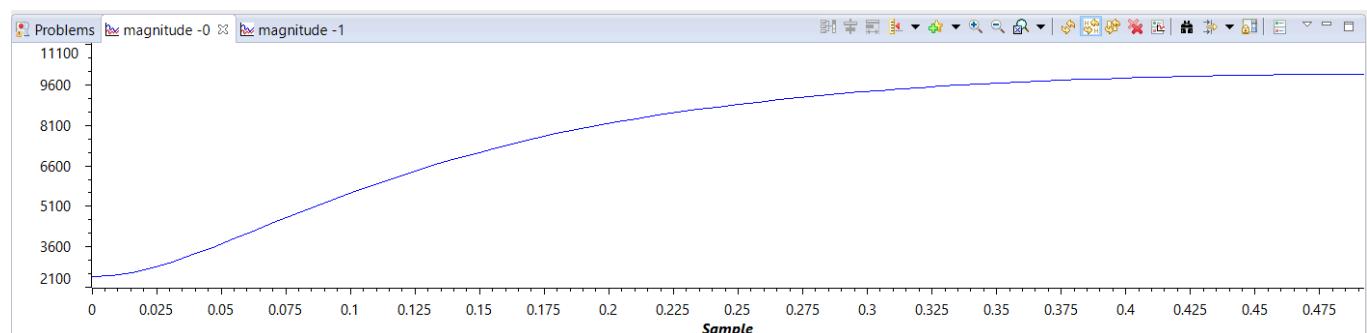
HP shelving filter (za $\alpha = -0.3$):

coefficients = {-9830, -32768, 32767, 9830}

Peak shelving filter (za $\alpha = 0.7$, $\beta = 0.0$):

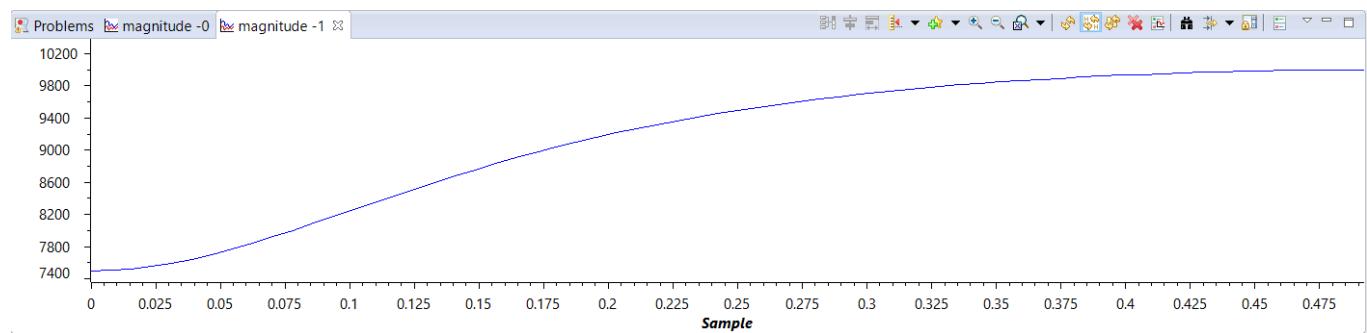
coefficients = {22937, 0, 32767, 32767, 0, 22937}

Zadatak 2):



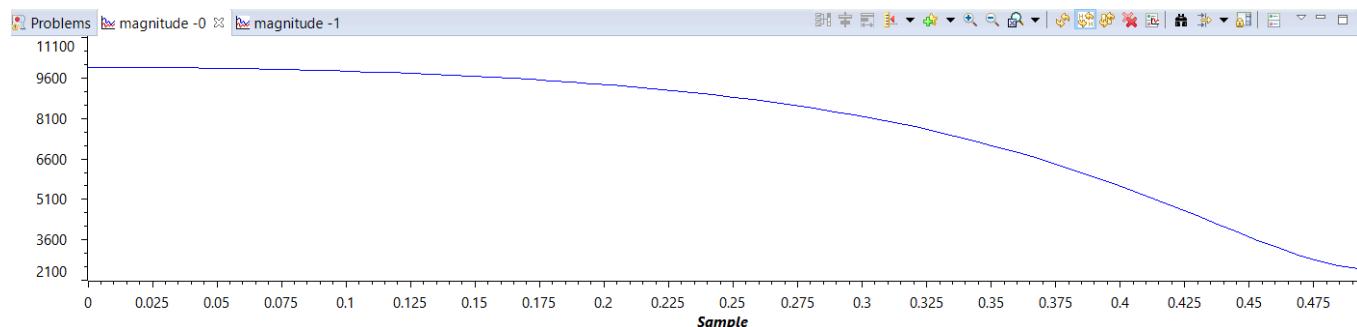
Slika 1: Prenosna karakteristika LP shelving filtra za $\alpha = 0.3$ i pojačanje K = 0.25

(skalirano na Int16 8192)



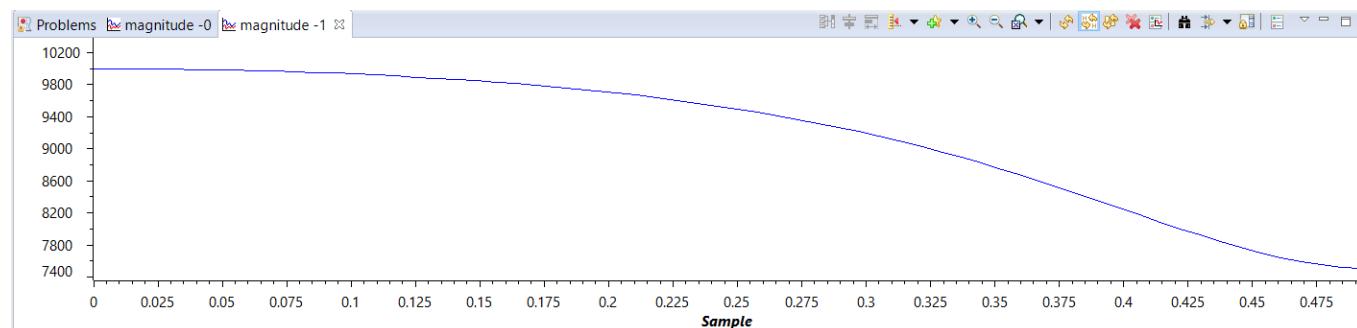
Slika 2: Prenosna karakteristika LP shelving filtra za $\alpha = 0.3$ i pojačanje K = 0.75

(skalirano na Int16 24576)

Zadatak 3):

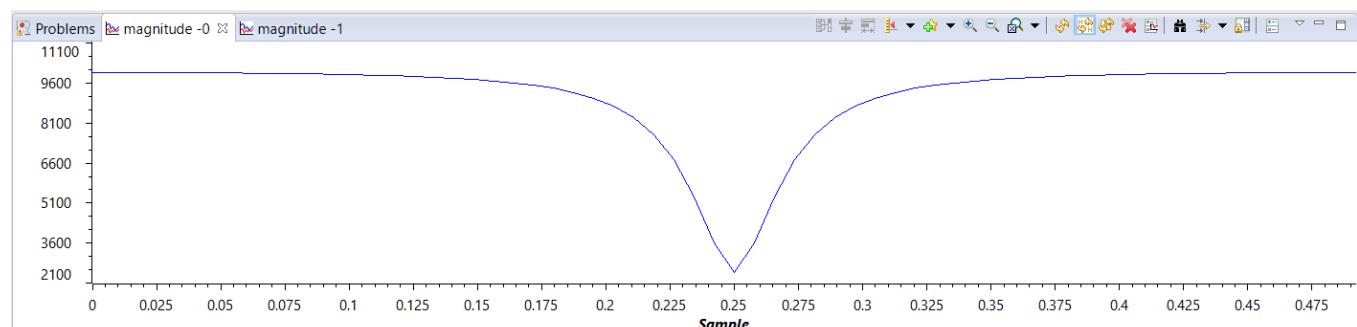
Slika 3: Prenosna karakteristika HP shelving filtra za $\alpha = -0.3$ i pojačanje K = 0.25

(skalirano na Int16 8192)



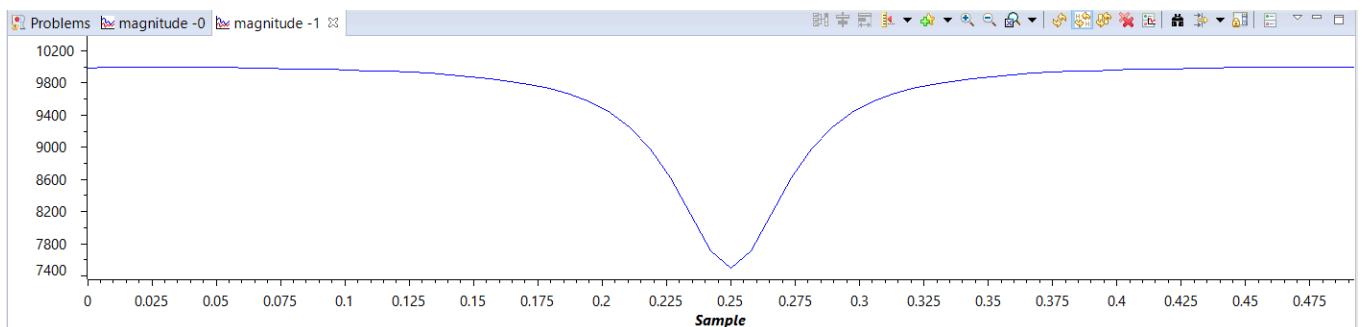
Slika 4: Prenosna karakteristika HP shelving filtra za $\alpha = -0.3$ i pojačanje K = 0.75

(skalirano na Int16 24576)

Zadatak 4):

Slika 5: Prenosna karakteristika Peak shelving filtra za $\alpha = 0.7$, $\beta = 0.0$ i pojačanje K = 0.25

(skalirano na Int16 8192)



Slika 6: Prenosna karakteristika Peak shelving filtra za $\alpha = 0.7$, $\beta = 0.0$ i pojačanje $K = 0.75$
(skalirano na Int16 24576)

Zadatak 5):

Parametri α i β su izračunati u posebnoj funkciji, $\alpha = \frac{2 \pm \sqrt{4 - 4 * (\cos(\omega))^2}}{2 * \cos(\omega)}$, $\beta = \cos(\omega)$,

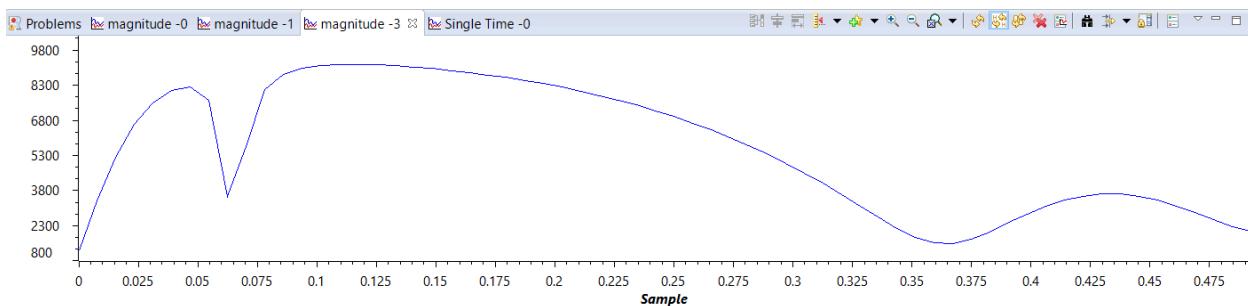
pri čemu je ω normalizovana frekvencija. Za LP shelving filter α se bira iz opsega (0, 1), dok se kod HP shelving filtra bira iz opsega (-1, 0). Kod Peak filtra, i α i β se biraju iz opsega (-1, 1).

LP shelving filter: $f = 220$ Hz $\alpha = 0.84$

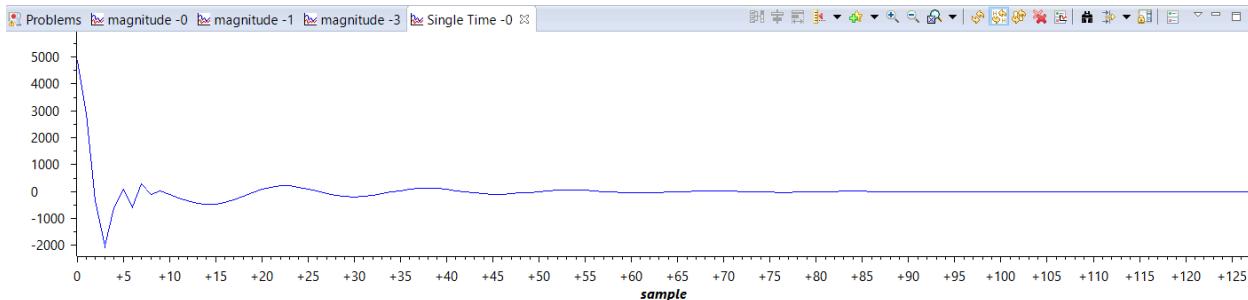
Peak shelving filter I: $f = 520$ Hz, $\Delta f = 110$ Hz $\alpha = 0.92$, $\beta = 0.92$

Peak shelving filter II: $f = 2905$ Hz, $\Delta f = 1355$ Hz $\alpha = 0.26$, $\beta = -0.65$

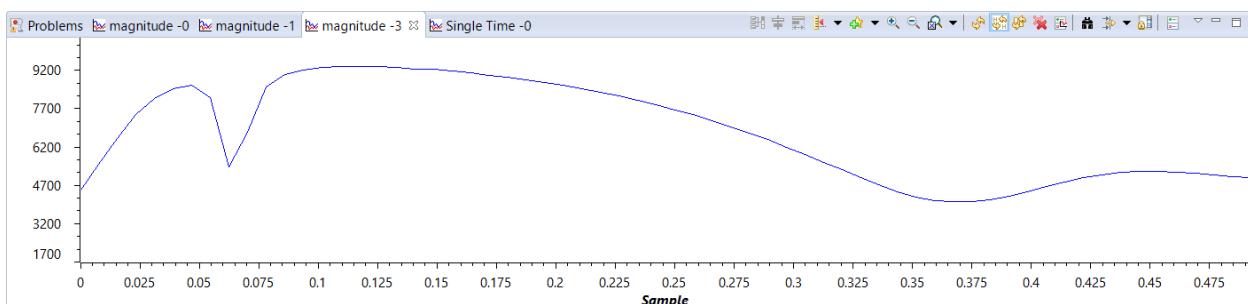
HP shelving filter: $f = 5$ kHz $\alpha = -0.41$



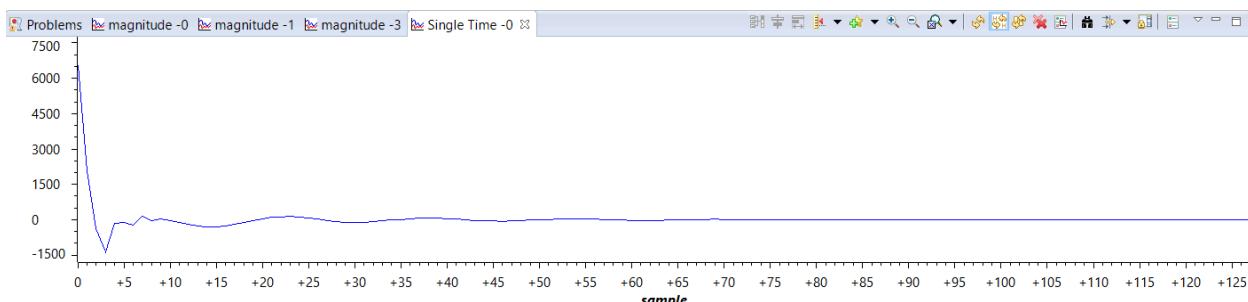
Slika 7: Prenosna karakteristika ekvalizatora za pojačanje $K = 0.2$ (skalirano na Int16 6554)



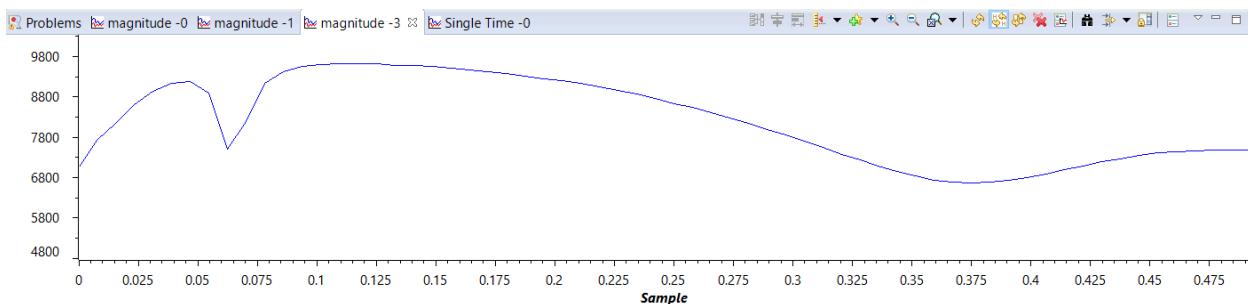
Slika 8: Impulsni odziv ekvalizatora za pojačanje $K = 0.2$ (skalirano na $\text{Int16} 6554$)



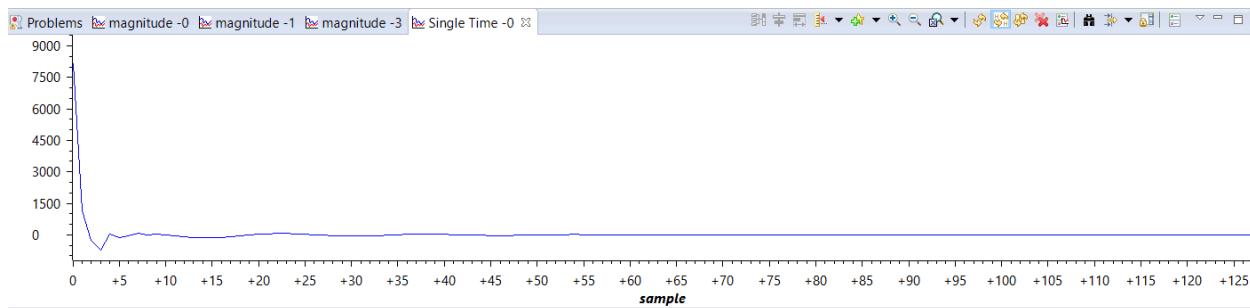
Slika 9: Prenosna karakteristika ekvalizatora za pojačanje $K = 0.5$ (skalirano na $\text{Int16} 16384$)



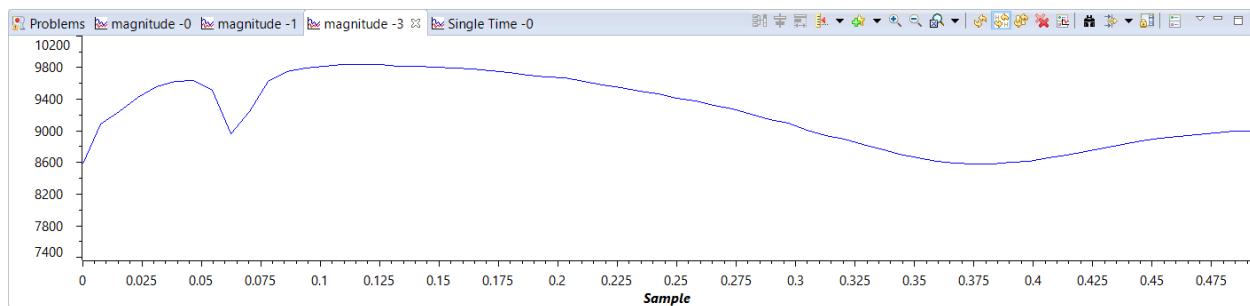
Slika 10: Impulsni odziv ekvalizatora za pojačanje $K = 0.5$ (skalirano na $\text{Int16} 16384$)



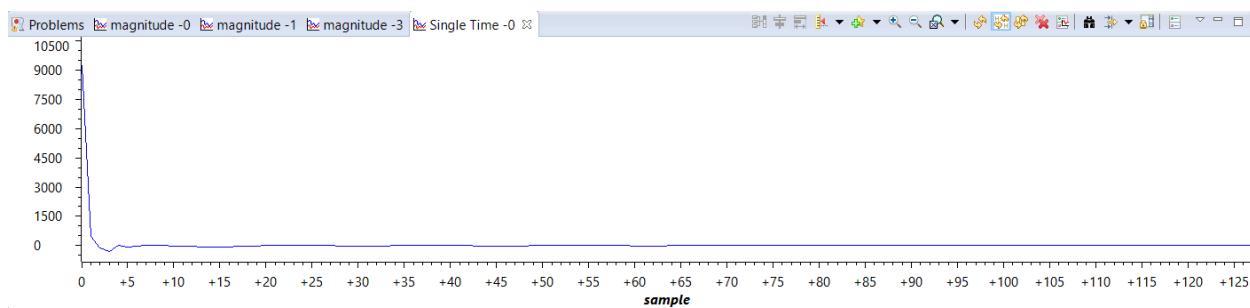
Slika 11: Prenosna karakteristika ekvalizatora za pojačanje $K = 0.75$ (skalirano na $\text{Int16} 24576$)



Slika 12: Impulsni odziv ekvalizatora za pojačanje $K = 0.75$ (skalirano na Int16 24576)



Slika 13: Prenosna karakteristika ekvalizatora za pojačanje $K = 0.9$ (skalirano na Int16 29491)



Slika 14: Impulsni odziv ekvalizatora za pojačanje $K = 0.9$ (skalirano na Int16 29491)