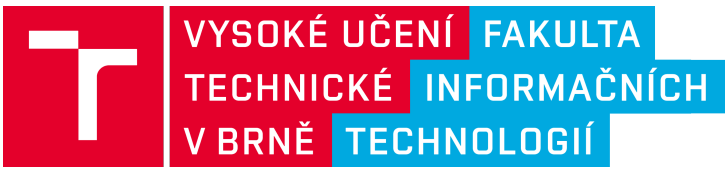
Brno University of Technology
Faculty of Information technology



Signály a systémy
Protokol
FIT VUT v Brně, 2022

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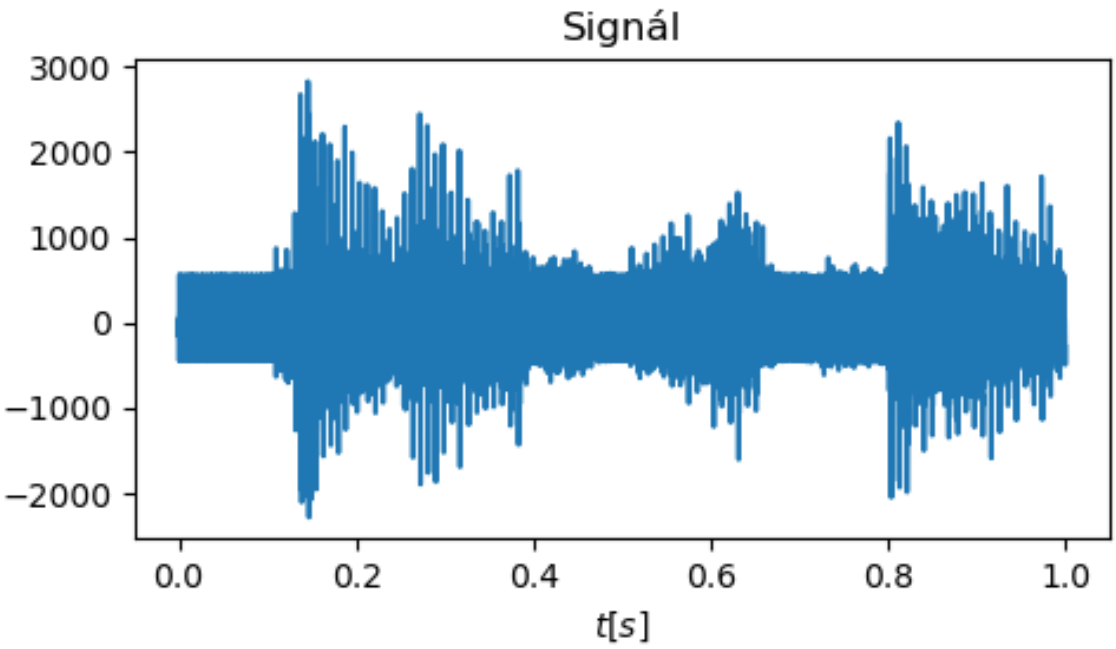
Contents

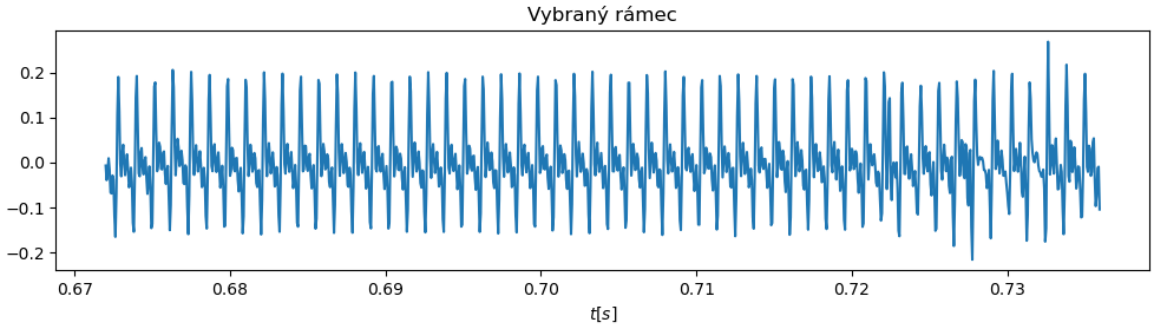
1 Úloha 4.1

Pocet vzorku signalu: 33485 [Vzorku]
Delka signalu: 2.0928125 [s]
Max: 2821
Min: -2276



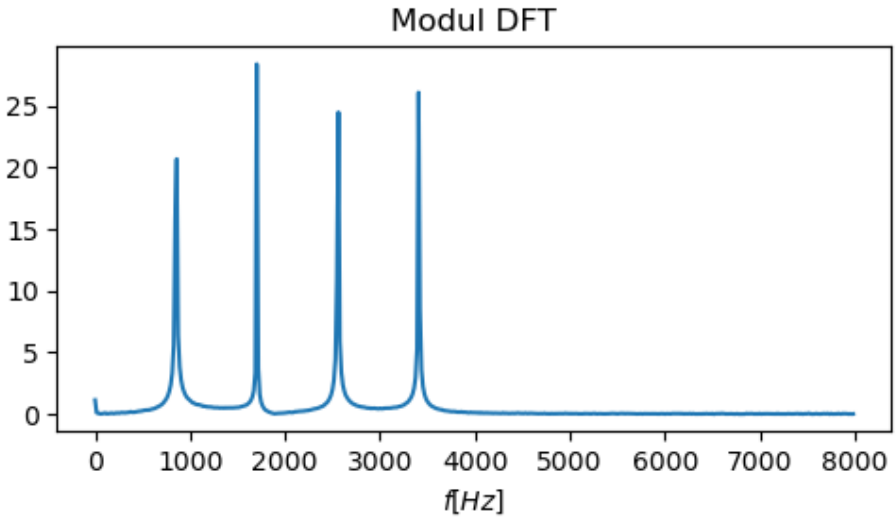
2 Úloha 4.2

Normalizace a ustředněni

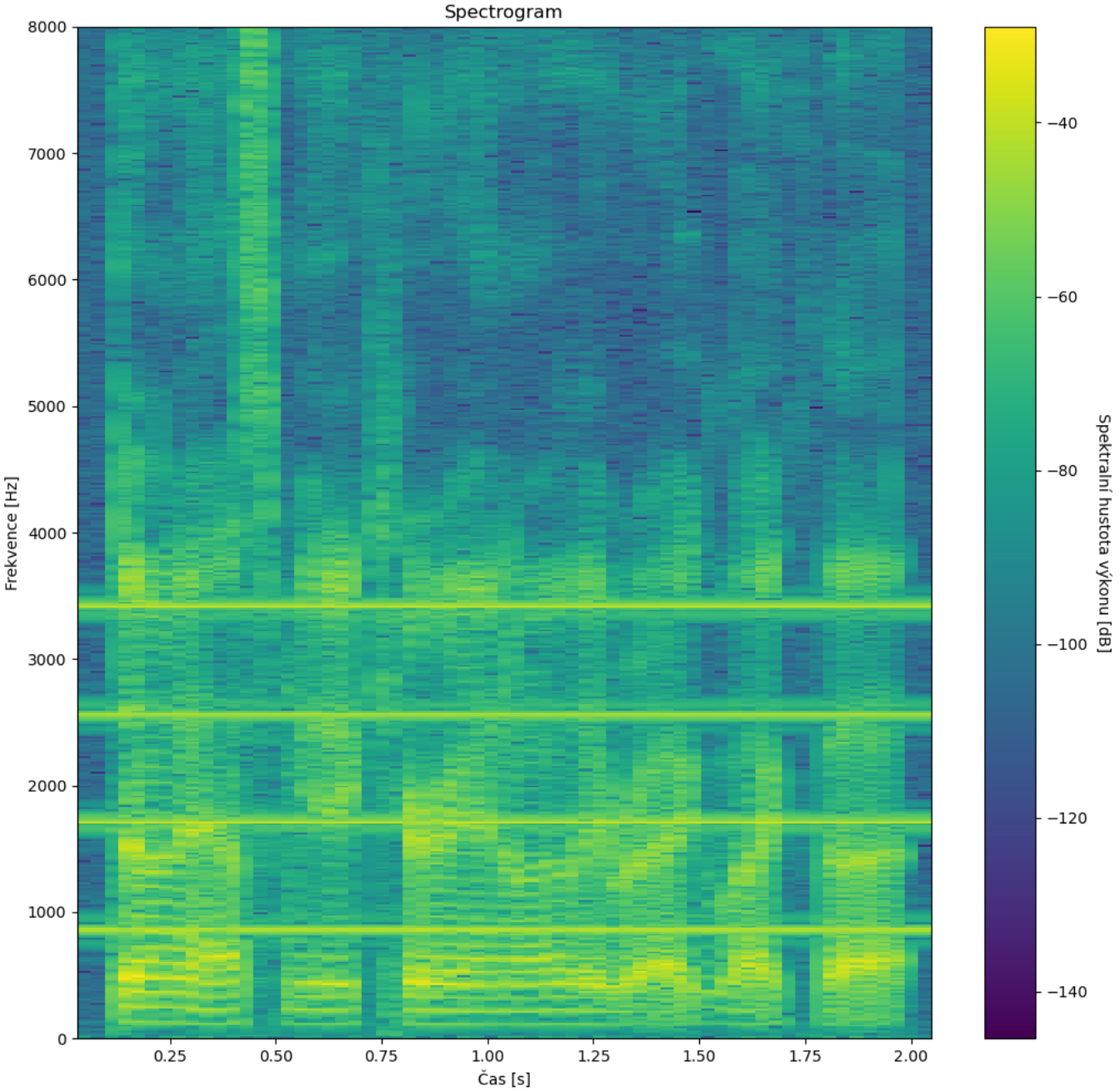


3 Úloha 4.3

```
def dft_func(frames):
res = []
N=1024
for tmp in frames:
my_dft = []
for k in range(1024):
dft = 0
step = 0
for i in range(31):
dft = tmp[i] * cmath.exp(-(cmath.pi*2j*k*i/N))
step = step + dft
my_dft.append(step)
res.append(np.array(my_dft))
return res
```



4 Úloha 4.4

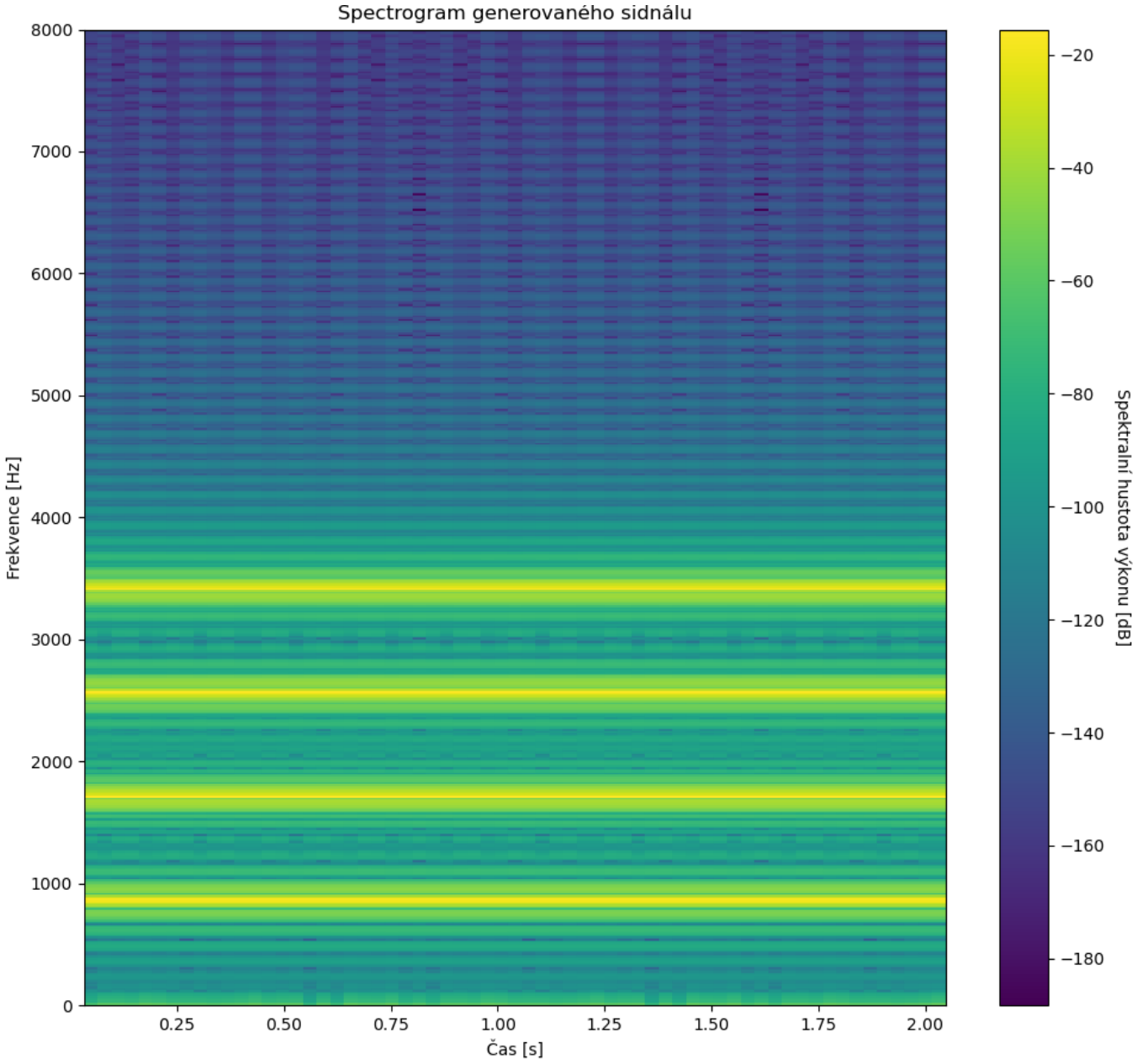

Spectrogram
Frekvence [Hz]
Čas [s]
Spektrální hustota výkonu [dB]
8000
7000
6000
5000
4000
3000
2000
1000
0
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
−40
−60
−80
−100
−120
−140

5 Úloha 4.5

```
freq1 = 852.5
freq2 = freq1 + freq1
freq3 = freq2 + freq1
freq4 = freq3 + freq1
```

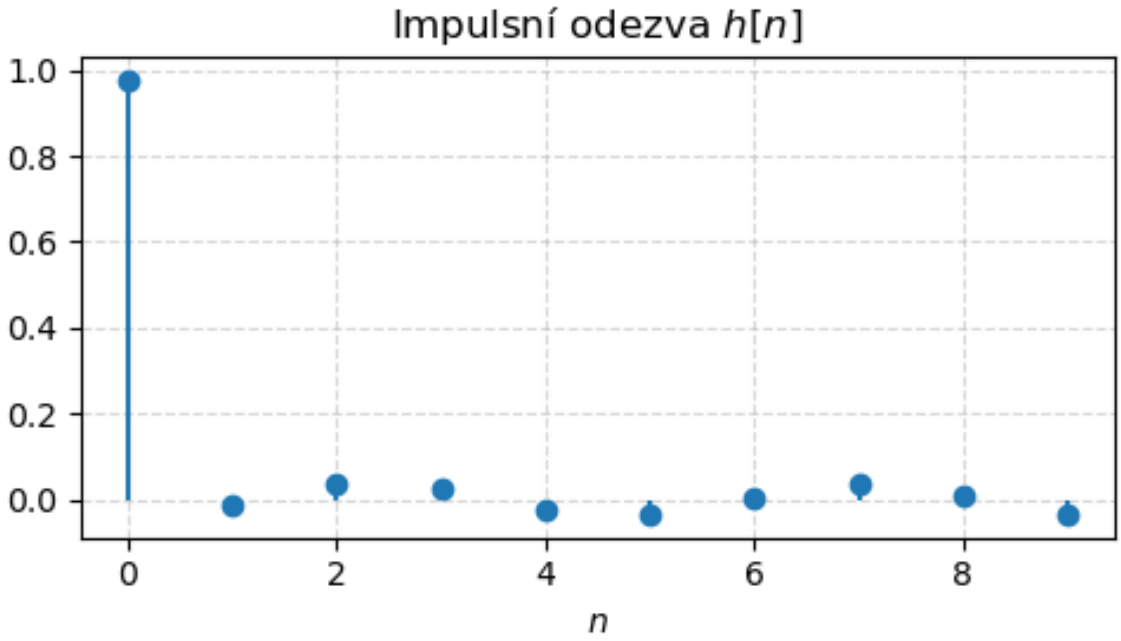
6 Úloha 4.6

```
cos1 = np.cos(np.array(samples) * 2 * np.pi * freq1)
cos2 = np.cos(np.array(samples) * 2 * np.pi * freq2)
cos3 = np.cos(np.array(samples) * 2 * np.pi * freq3)
cos4 = np.cos(np.array(samples) * 2 * np.pi * freq4)
```

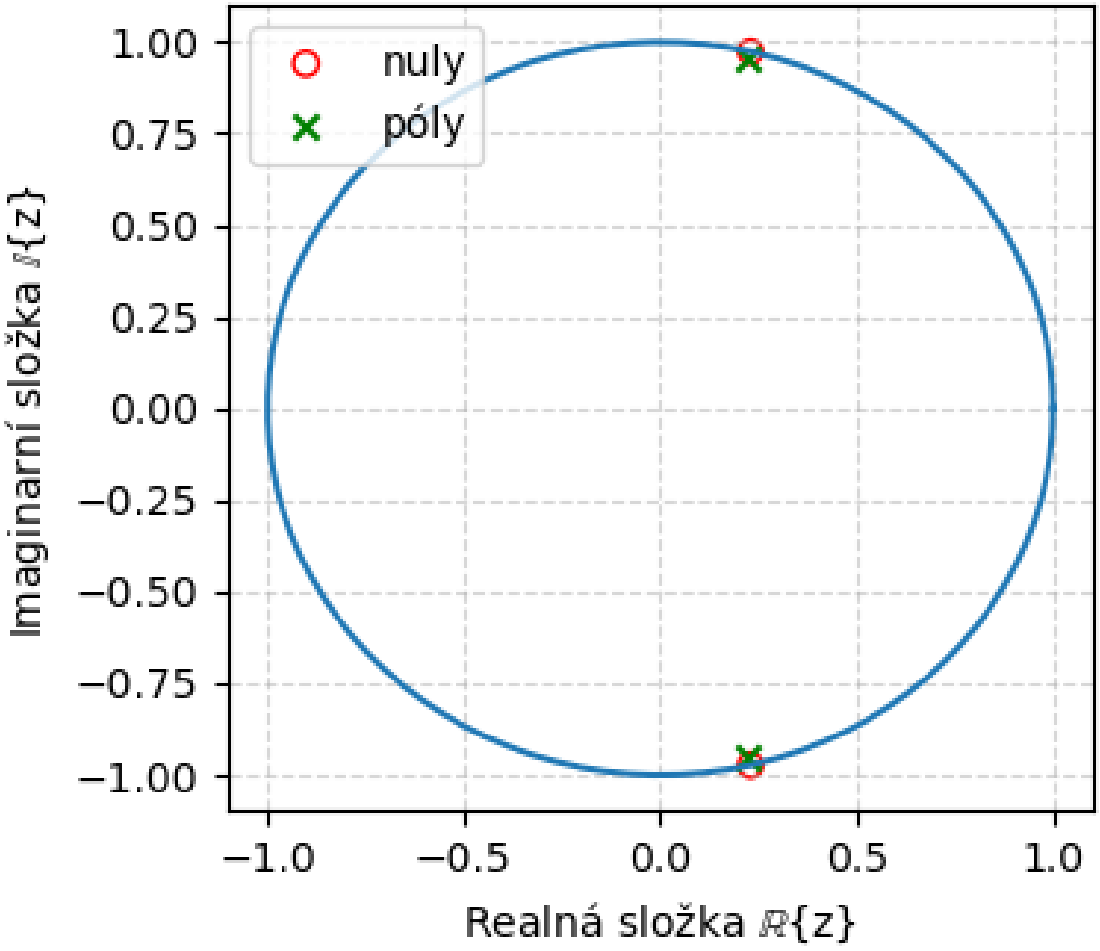


7 Úloha 4.7

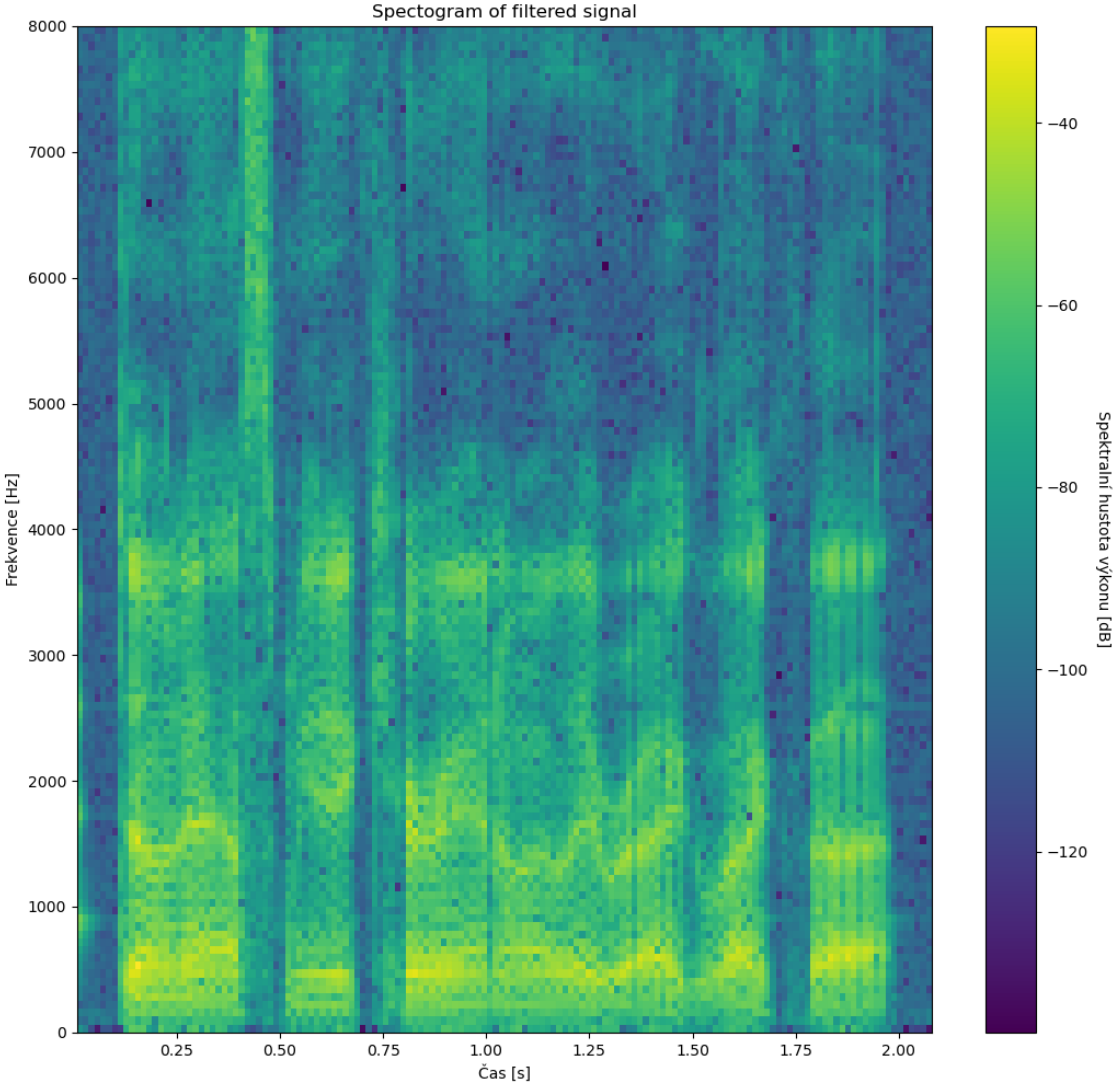
Varianta filtru – 3



8 Úloha 4.8


nuly
póly
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−1.0
−0.5
0.0
0.5
1.0
Imaginarní složka ℑ{z}
Realná složka ℜ{z}

9 Úloha 4.10


Spectogram of filtered signal
Frekvence [Hz]
Čas [s]
Spektralní hustota výkonu [dB]
0
1000
2000
3000
4000
5000
6000
7000
8000
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
−40
−60
−80
−100
−120