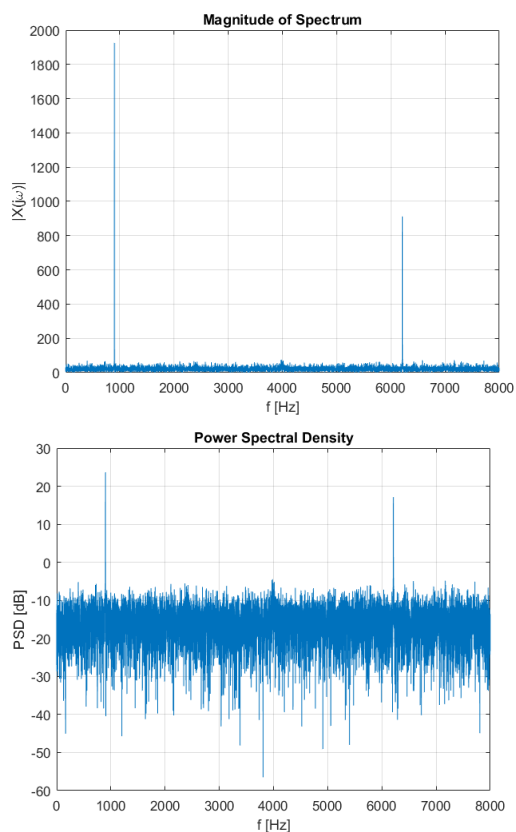


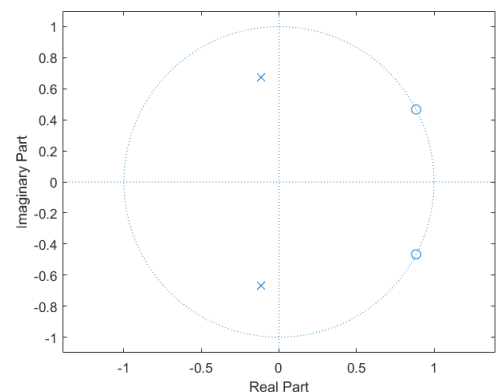
1. Signal was loaded by function *audioread*. The basic informations about signal were found out.
Sampling frequency: **16 000 Hz**
Length in samples: **16 000**
Length in seconds: **1 s**

2. The spectrum of signal was calculated by function *fft*. A graph of magnitude is below. Spectrum was adjusted to the power spectral density to make it more readable.

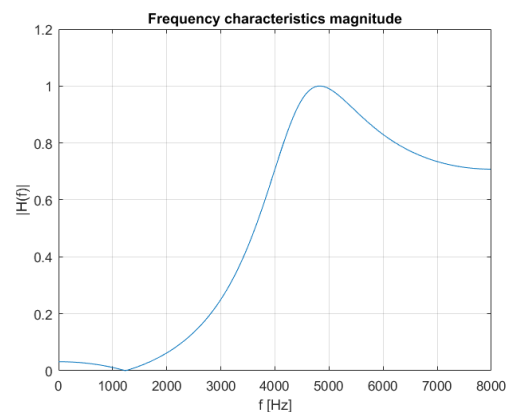


3. The maximum spectrum magnitude is located at frequency **900 Hz**.

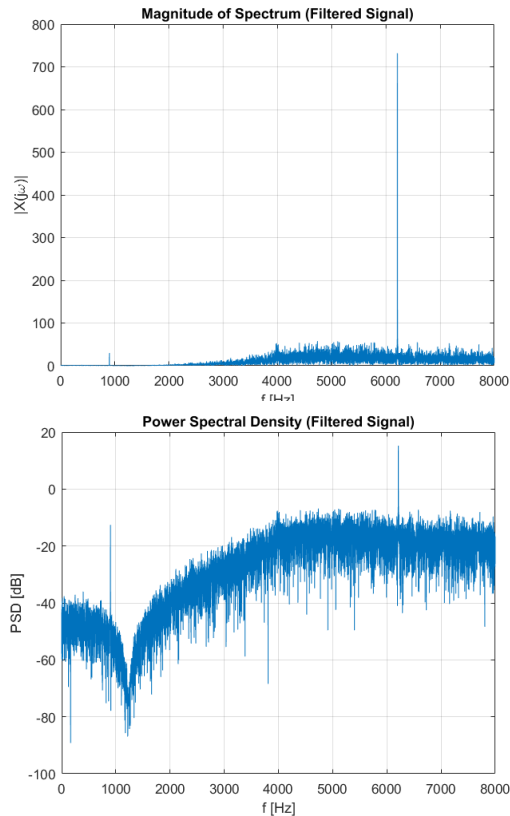
4. To draw zeros and poles there was used function *zplane*. Stability of filter was verified by function *roots*. Filter is **stable**, because condition of stability is fulfilled.



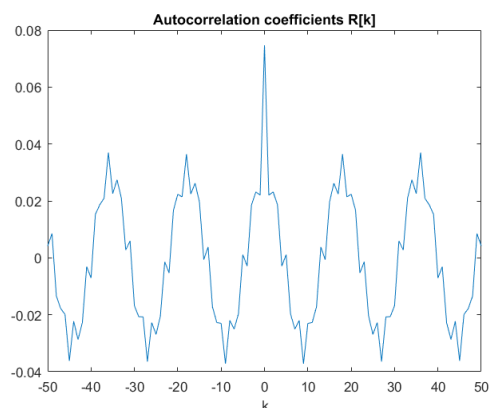
5. Frequency characteristics was calculated by function *freqz*. A graph below describes its magnitude and we can see that filter is **high pass**.



6. Input signal was filtered by function *filter* with specified coefficients. There are below graphs of magnitude and power spectral density of filtered signal.



7. The maximum spectrum magnitude of filtered signal is located at frequency **6211 Hz**.
8. Periodic wave signal was generated by function *square*. Signal was correlated with wave signal by function *xcorr* and the biggest correlation was at sample **9368** at time **0.5855 s**.
9. Biased estimate of the autocorrelation coefficients was calculated by function *xcorr*.

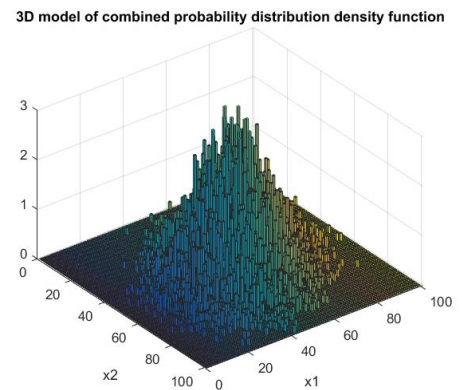


10. Value of coefficient $R[10]$ is **-0.023029**.

It was found out from vector R_v on index 61.

11. Time estimate was made by function *hist2opt*, which was modified.

Samples n and $n+10$ were compared.



12. Integral value was verified by function *hist2opt*. Result of integration is **0.999375** and we wanted **1**. It means

there may be possible errors and deviations.

13. Autocorrelation coefficient $R[10]$ was calculated by function *hist2opt*. It has value **-0.023027**.

Difference between autocorrelation coefficient $R[10]$ in task 10 and task 13 is smaller than **$2e-6$** . Result of integration in task 12 could cause the difference. We can say values are the same.