1. Describe the main steps of the Welch’s method.

2. Describe the differences, advantages and disadvantages of the Bartlett’s and the Welch’s methods for PSD estimation.

3. Digital signal of length N was zero-padded by 3N zeros. Sampling frequency is *fs*. What is the frequency resolution of the PSD (periodgram) of the original signal and of the zero-padded signal?

4. For what values of parameter  is the filter, governed by the equation below, stable? Calculate poles and zeros of this filter.

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5. A digital filter has zero at  and poles at  and , where  are the real constants. Determine the transfer function, the frequency response function of the filter and its static gain.

6. Derive for the filter from question 5 the corresponding difference equation and a direct structure diagram. For what values of parameters  the filter is stable?