**Practical session 2**

1. 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.

2. Derive for the filter from question 4 the corresponding difference equation. For what values of parameters  the filter is stable?

3. For what values of parameter  is the filter, governed by the equation below, stable?

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4. Compute the linear convolution of the discrete-time signal  and the impulse response function of filter 

using the “DFT and the IDFT approach”.

5. Explain how the wavelet transform based on the real biorthogonal “decomposition” wavelet bior 1.5 (the wavelet shape is written on page 211 of “Lecture Notes”) can detect the “brick wall” discontinuity, i. e., when a constant positive signal, , suddenly drops to a constant negative value 

6. Explain for the task in question 6 the dependency between the time localization (i.e., time resolution) of the signal discontinuity and the scale factor of the wavelet transform based on the biorthogonal *“decomposition”* wavelet *bior 1.5.*