

Laboratory work 3, Preliminary questions

## Laboratory work 3 STUDYING OF PULSES AND RANDOM SIGNALS

## **Preliminary questions**

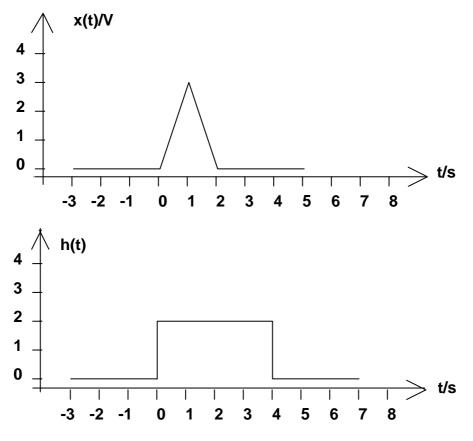
Return the answers to the preliminary questions for the assistant in the beginning of the laboratory work. Before returning take a copy of them for yourselves.

1. What is meant by the following terms when talking about (voltage) signals?

Mean value Standard deviation Variance Autocorrelation Power spectrum

2. Consider a signal  $x(t) = 2 V^{*}\cos(2^{*}pi^{*}f1^{*}t)+3 V^{*}\sin(2^{*}pi^{*}f2^{*}t)$ , where V = volt, f1 = 1200 Hz and f2 = 1500 Hz. The signal is fed into a nonlinear system. The output signal of the system is  $y(t) = x(t) + 0,1^{*}x^{2}(t)$ . Which frequencies does y(t) consist of? Make a table of the frequencies and the corresponding amplitudes in volts and dBV's. Write down the used equations and formulas, too!

3. Sketch the convolution of the signal x(t) and the impulse response h(t) shown below. Signal x(t) is an equal-sided triangle which duration is 2 s and maximum value 3 V. Impulse response h(t) is a rectangle which duration is 4 s and maximum value 2. Write down the used equations and formulas, too!



## Laboratory work 3: Studying of pulses and random signals Preliminary questions