Exercise Lesson 13

**Problems from the compendium:**

    6.10, 6.5, 6.6, 6.11b

Other problems:

13.1 Assume a communication system employing binary PAM modulation with equally likely signal alternatives. The combination of the transmit pulse $g(t)$, channel filter $h(t)$, and receiver filter $v(t)$ can be written as $x(t) = g(t) * h(t) * v(t)$. The signal is sampled in the receiver at time instants $\mathcal{T} + i\,T_s$, $i = 0, 1, 2, \ldots$.

The signal $x(t)$ is given as follows:
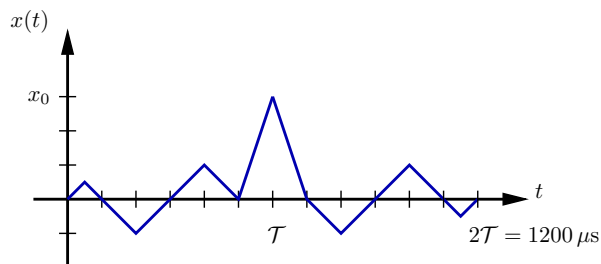
(a) What is the maximum possible symbol rate for ISI-free reception?

(b) Let us now tolerate some ISI and choose $T_s = 200\,\mu$s. Draw the discrete impulse response $x[i]$ of the system for this particular case.

(c) Is there a risk for erroneous decisions, assuming noise-free transmission with $T_s = 200\,\mu$s? In order to answer this question, give an example of an information sequence $A[i]$ for which the worst case ISI occurs.