

Exercise Lesson 10

Problems from the compendium:

3.9, 3.19, 3.22, Example 3.7 on page 135

Example 3.19 on page 168, 4.1, 4.6, 4.25

Other problems:

10.1 Consider a 2-ray multi-path channel with impulse response

$$h(t) = \sum_{i=1}^2 \alpha_i \delta(t - \tau_i) , \quad \text{where } \alpha_1 = 1, \alpha_2 = 0.5, \tau_1 = 0 \mu\text{s}, \tau_2 = 1 \mu\text{s} .$$

A binary PAM signal with triangular pulse $g_{tri}(t)$ of amplitude A and duration $T = 2 \mu\text{s}$ is transmitted over this channel.

- (a) Determine the largest bit rate R_b for which no overlap of signal alternatives will occur after the channel.
- (b) Draw the signal $z_1(t)$ at the output of the channel for the input $s_1(t) = A g_{tri}(t)$.
- (c) Your task is to implement an ML receiver for the given system by means of a matched filter. Determine the impulse response $v(t)$ of the matched filter.