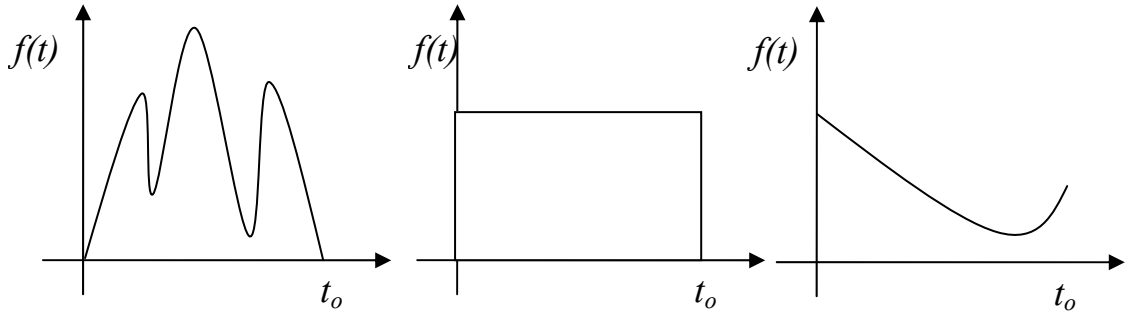
EEE 317 Tutorial questions – Matched filters

1) State the impulse response of a matched filter in terms of an incoming signal, *x(t)*.

2) Sketch a transversal filter with 4 taps.

3) Sketch the impulse response of a matched filter for the following waveforms,

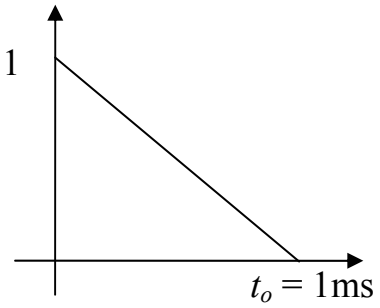


4) Write down what the convolution and correlation of two properties, *h(t)* and *i(t)*.

5) Show how a matched filter, which is defined in terms of convolution of two quantities, can be realised using the correlation function.

6) Give an example as to why synchronisation is important when using a matched filter to detect PCM codewords.

7) Derive tap weights for a transversal filter with four taps (equally spaced in time) in order to implement the following signal waveform.



8) What is the difference in operation between an integrate and dump matched filter and a matched filter for the detection of PCM codewords.

9) The aim of a filter is the admission of signal power and rejection of noise power, why does this cause a conflict? In light of this, what are the aims of a matched filter?