Note: You will need to download the Python notebook `channel` from the course webpage. Before performing the experiment, read the comments in the notebook.

1. Construct a small artificial bit-stream ($\sim 5 - 7$ bits), and convert the stream into NRZ-L Binary PCM signals. Pass this (sampled) waveform through the (digitally simulated) analog channel using the given function `channel`, without adding noise. Vary the cut-off frequency of the channel, plot the received signal and observe the ISI effect. Adjust the cut-off frequency of the Butterworth filter depending on your waveform sampling rate.

2. Generate a random bit stream (or use a bit stream from the audio file of the previous lab) and convert it into the binary NRZ-L PCM signal. Pass this (sampled) waveform through the (digitally simulated) analog channel using the given function `channel` and detect the transmitted message using matched filter followed by a decision process.

3. Compute the bit-error probability for different cut-off frequencies and noise variance. Once the cut-off frequency is low enough, how does increasing the signal power affect the bit-error probability?