

Birla Institute of Technology & Science, Pilani, Rajasthan
First Semester 2020-2021
Lab-12: Matched Filter based Baseband Digital Transmission

Course: EEE F311 Communication Systems
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Objectives

In this task, the objective is to transmit binary data and detection using Matched Filter.

Task 1

In Lab 2, we have already converted a sentence into binary digits. In this task, write your full name and convert it to binary digits. Your name as digital data will be transmitted as baseband over a bandwidth-unlimited channel $h(t) = \delta(t)$. The binary data will be line encoded as an NRZ polar pulse. Thus for binary digit '1' transmit $\Pi(t/T)$ and for binary digit '0' transmit $-\Pi(t/T)$. Use the real time code to show the data transmissions for whole duration for transmission rate 2 pulses per second, where each pulse contains a single bit. Add AWGN to demonstrate the impact of additive noise. Detect at the mid-point of each pulse to get the corresponding bit stream and thus receive your full name. Increase the variance of noise to cause an error!

Task 2

Apply a matched filter at the receiver and then detect the corresponding bit stream, thus receive your full name. What is an advantage of the MF?

Task 3

Repeat Task 1 and Task 2 by introducing a low pass channel.

Project Task

We have started individual tasks with a bigger picture: to design an end-to-end simulator for a digital communication system. In this task, we will study the baseband digital transmission with MF based detector.