Faculty of Information Engineering & Technology
Communications Department
Course: Channel Coding [COMM 604]

Practical Assignment (Milestone 1)

Due Date: May 13^{th} 2025

Consider a channel encoder/decoder system. Assume the information bits (i.e., bits input to the channel coding process) are extracted from a video stream. The channel coded bits are transmitted over a communication channel with probability of error p. You are asked to write a MATLAB code to simulate the transmission of the encoded bits over the communication channel.

NOTES:

1. You are allowed to use MATLAB built in functions for the encoder and decoder.
2. You are encouraged to work in teams that SHOULD NOT exceed 4 students (group members do not have to be in the same tutorial).
3. Each group will get a different set of Convolutional codes to compare.
4. Deadline for determining groups is April 23^{rd} 2025 through https://docs.google.com/spreadsheets/d/1UQegW2PQgHIHZmV_9ttIkEsqgPa81_6_khMgWks7bcQ/edit?usp=sharing
   If you do not send your group by the deadline above, it will be assumed that you will work individually.
5. Each group will be assigned a set of codes to use in the project that will be posted in cms after group formation.
6. Useful commands for the Practical Assignment will be uploaded on the course website.

EVALUATION AND DELIVERABLES:

- Each group should prepare the following:
  - A SINGLE document with the following content:
    - The rate of all codes
    - Plot of the coded bit error probability against different values of p (Assume a range of p between 0.0001 and 0.2) for all codes.
    - Identify the code that exhibits the best performance and explain your opinion why it features such favorable performance.

Convention used for determining codes in email sent to groups:

1. Convolutional Codes:

K, $g_i^{(j)}$

K : Constraint Length
$g_i^{(j)}$: Information about the structure of the convolution encoder circuit. Please note that the convention is to write $g_i^{(j)}$ in octal form (to the base of 8). i.e., $g_i^{(j)} = 7$ ➔ $g_i^{(j)}$ (1 1 1), $g_i^{(j)} = 12$ ➔ $g_i^{(j)}$ (1 0 1 0)