EE698H: 5G Wireless Standards Design **EE Dept. IITK**

MATLAB Assignment-3

5G Transceiver Implementation -II *June. 2023*

The objective of this assignment is to implement rate matching and rate recovery modules. These modules should be integrated with the existing transceiver modules. Your code should contain

1. Transmit chain which will
   - Generate a transport block (TB) of size 20496 and append TB-CRC
   - Segment the TB and calculate and append the CB-CRC (implement the segmentation from the standard)
   - LDPC encoding for all the segmented code blocks (Interleaving and interlacing are not included)
   - Perform rate matching for MCS 9 by considering an allocation of 100 PRBs over a slot of 14 symbols. You can assume that six REs in a slot are reserved for pilots. Assume that RV0 is being transmitted.
   - Perform code block concatenation
   - Perfom QPSK modulation according to the standard. You should remove the BPSK modulator (mod_output) provided with the LDPC encoder
2. Receive chain which will
   - Perfom QPSK demodulation (create a new QPSK demodulator function by modifying the BPSK demodulator provided with LDPC decoder)
   - Perform code block segmentation
   - Perform rate recovery for MCS 9 assuming RV0
   - Perform LDPC decoding for each segmented code block
   - Validate and remove the CB-CRC for each code block
   - Concatenate the segemented decoder code blocks
   - Show that the transmit and receive code block match

You have to only implement the modules marked in red.
Please follow these Coding instructions:

- Properly comment your code.
- The code should execute and generate the desired output.
- Your submission should be self-contained (should include all the files required for running it).
- Avoid hard-coding the values of the variables for specific configurations. The code should be generic.

Please follow these submission instructions.

- Deadline is 18th of June, 11:59 pm.
- All codes should be in one .zip/.rar folder. Please do not submit separate files.
- Upload your properly commented in drive link which is provided to you. Name your code as rollno.zip.
- Please submit one final zip file.
- Please do not mail your file to me.

Please also read this carefully.

- Each one of you have to individually do all the reading and MATLAB assignments. You can discuss with your friends but you will have to completely write your own code.