Project # 2

Modern Coding Theory
Spring, 2022

☐ Due: May 25, 2022

☐ Problem

- Design of regular LDPC codes with given parameters by using the Progressive Edge-Growth (PEG) Algorithm.
  Hu et al., "Regular and Irregular Progressive Edge-Growth Tanner Graphs," IEEE TCOM 2005.
- Performance evaluation of regular LDPC codes under the sum-product algorithm

☐ Assumption

- AWGN channels are assumed.
- The degrees of variable and check nodes are regular.
- The number of iterations is 10, 20, and 50, respectively.
- The lengths of LDPC codes are 600, 1200, and 2400.
- Code parameters are given as follows:
  1) degree of variable nodes : 3, degree of check nodes : 4
  2) degree of variable nodes : 3, degree of check nodes : 5
  3) degree of variable nodes : 3, degree of check nodes : 7
  4) degree of variable nodes : 3, degree of check nodes : 8
  5) degree of variable nodes : 4, degree of check nodes : 6

6) degree of variable nodes : 4, degree of check nodes : 8

7) degree of variable nodes : 4, degree of check nodes : 10

8) degree of variable nodes : 5, degree of check nodes : 6

9) degree of variable nodes : 5, degree of check nodes : 8

10) degree of variable nodes : 5, degree of check nodes : 10

☐ Output

(1) Source file and execution file

(2) Report (hard copy and soft copy)

- Report should be written in a paper style. In other words, Introduction, main body describing an algorithm and what to do, Numerical Results and Discussion, and Conclusions should be included.
- Simulation results should include BER curves with respect to E_{b}/N_0.

☐ Tools

- C/C++ (strongly recommended)
- Matlab (permitted)