Exercises - MWC 2019

CHAPTER 6: CODING FOR ERROR DETECTION AND CORRECTION

I. BLOCK CODING

Problem 1.1.

(7,4) block code has the generator matrix G:

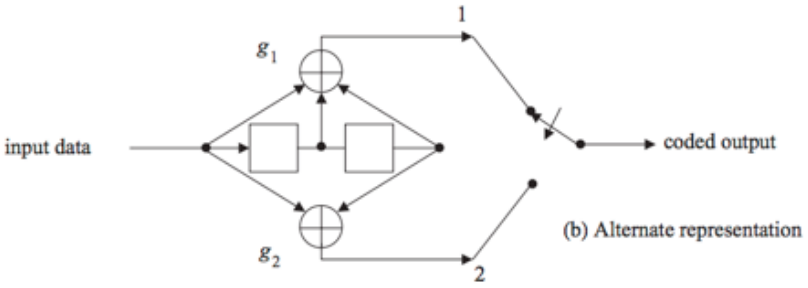
$$\mathbf{G} = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Find the parity-check matrix H and its transpose H^T

II. CONVOLUTIONAL CODING

Problem 2.1.

Consider a convolutional coder K=3, rate= 1/2:



1. Initialize the encoder so that 0s only appear at its output. Trace the output bit sequence for the following input bit sequence after initialization:

   11001011

2. Determine the state diagram representing this encoder. Trace through the various states through which this encoder moves for the input sequence of (a), starting at the 00 state. Show the output sequence obtained agrees with that found above.