S-72.341 CODING METHODS

Tutorial 5

1. The generator polynomial of a cyclic $(7,4)$ code is $g(x) = 1 + x + x^3$.
   a) Find the systematic code word corresponding to the message word 1011.
   b) Sketch a diagram of the systematic encoding circuit for the code. Demonstrate how the code word of part a is formed, i.e. list the values of the shift registers for different phases of the encoding procedure.

2. Sketch a diagram of the syndrome computation circuit for the $(7,4)$ code of the previous problem. Demonstrate how the zero syndrome is formed by listing the values of the shift registers for different phases of the syndrome computation procedure.

3. (Wicker, problem 5.18) List by dimension all of the binary cyclic codes of length 31.

4. (Wicker, problem 5.19) List by dimension all of the binary cyclic codes of length 63.

5. (Wicker, problem 5.20) List by dimension all of the binary cyclic codes of length 19.

6. (Wicker, problem 5.21) List by dimension all of the 8-ary cyclic codes of length 33.