

## EE6606 Theory and Practice of Error Control Coding

**Homework 5** Assigned October 11, 2000, due October 25, 2000 (8am).

Implement (in software) a narrow sense BCH code of length 63 capable of correcting  $t=1$  error using a generator polynomial approach (no generator matrices, parity check matrices, or standard arrays allowed). A shift register implementation of the encoder and decoder may be easiest. Use the construction of  $GF(64)$  given in Appendix B.3, p. 465 of text. First thing to convince yourself is that  $g(x)$  has degree 6.

You should have two separate programs: one encoder program, one decoder program. Your program will be checked by me as follows: I will email you a vector of length 63 and you will decode it to a valid codeword. You will email back to me the original codeword I sent to you, and the corrected codeword.

The codeword you will receive is in descending powers of  $x$ :

$$\underline{r} = 1\ 0\ 1\ 1\ 0 \quad \leftrightarrow \quad c(x) = x^4 + x^2 + x^1$$

The email must be received by 8am October 25, 2000. No late projects accepted. A copy of the source code is due at that time as well (email is fine).