

18.310 Assignment 5 Due Wednesday October 13, 2004

1. Find a primitive polynomial of degree 6; find the equations satisfied by the remainders of its third and fifth powers.

Thus construct a three error correcting BCH code.

2. Construct a spreadsheet encoder for the two error correcting BCH code you get. And construct a spreadsheet that finds the remainder on dividing by your primitive polynomial if the sum of the error monomials, also of the sum of their cubes.

3. Using the information from the previous question construct a spreadsheet that corrects up to two errors automatically. (By testing each monomial remainder to see if it obeys the error locator equation.)

Hint: instead of testing the monomial y to see if it obeys

$$\text{remainder } (y^2 + s_1 y + s_2) = 0 \text{ instead test}$$

$$\text{remainder } (t_1 y^2 + t_1 s_1 y + t_1 s_2) = 0 \text{ (this is slightly easier to form)}$$

4. Construct a divider, that will retrieve the original message from the corrected message by dividing by the encoding polynomial.

5. Outline the steps you would have to perform if you want to correct 3 errors, both in coding and error correcting.