M 375 – Homework 11

Page 72, problem 15:

If $g(x)$ is a polynomial with odd weight the codeword (11…1) can be produced by permuting this generator polynomial and adding all the codewords together.

For a code *C* which does not contain (11…1), the generator polynomial must be of even weight, thus all codewords must be of even weight.

Page 72, problem 16:

The defined behavior of $C^{\perp}$ is such that the generator matrix of $C^{\perp}$, $G_{C^{\perp}}$, is the parity check matrix of *C*, H_C. This parity check matrix, H_C, is the generator matrix of a $[n, n-k]$ code and the matrix has the form $H_C = G_{C^{\perp}} = \left[A^{\mathrm{T}}, I_{n-k}\right]$.

Page 72, problem 18:

Suppose $g(x)$ is the generator polynomial $\Rightarrow$ $g(x)$ is the smallest polynomial generating the cyclic code.

If $g_0 = 0$ the whole generator polynomial could be divided by *x*, yielding a smaller generator polynomial. This is a contradiction.