

CENG290 Data Communications

Labwork 7

Cyclic Redundancy Check

Cyclic Redundancy Check (CRC) is an error detection method for detecting changes that has happened during transmission of bits from one network device (Device A) to another (Device B). To calculate CRC, you need a bit sequence (the data) and a polynomial. The steps are as follows:

1. Concatenate data with as many zeros as the order of the polynomial.
2. Divide the concatenated data by the polynomial.
3. Remainder is CRC.

After calculation of CRC, Device A sends the data, the polynomial and the CRC to device B. When device B receives these three items, it does the following to check whether the data has been received correctly or not.

1. Concatenate data with received CRC.
2. Divide the concatenated data by the polynomial.
3. If the remainder is zero, then no error has occurred. Otherwise, error(s) have happened during transmission.

Write two MATLAB functions, `ceng290_crc_calculate()` and `ceng290_crc_check()` as follows:

```
function result = ceng290_crc_calculate(data, poly)
    ....
end

function result = ceng290_crc_check(data, poly, crc)
    ....
end
```

You may test your functions by executing the following on the command prompt:

```
data = [1 1 0 1 0 1 1 0 1 1];
poly = [1 0 0 1 1];
crc = ceng290_crc_calculate(data, poly);
if ceng290_crc_check(data, poly, crc) == true
    fprintf('No errors');
else
    fprintf('Error(s) happened');
end
```