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Exp8.m

```
1 clc;
 2 clear all;
 3 close all;
 5 % Input parameters
 6 n = input('Enter the value of n: ');
 7 k = input('Enter the value of k: ');
 8 m = n - k;
10 % Generate generator polynomial for the cyclic code
11 G = cyclpoly(n, k, 'max');
12 disp('Generator polynomial:');
13 disp(poly2sym(G));
14
15 % Generate codewords using the generator polynomial
16 d1 = [1 0 0 0];
17 c1 = poly2sym(d1) * poly2sym(G);
18 d2 = [0 1 0 0];
19 c2 = poly2sym(d2) * poly2sym(G);
20 d3 = [0 0 1 0];
21 c3 = poly2sym(d3) * poly2sym(G);
22 d4 = [0 0 0 1];
23 c4 = poly2sym(d4) * poly2sym(G);
24
25 % Display codewords and data vectors
26 disp('Data vectors:');
27 d = [d1; d2; d3; d4]
28 disp('Codewords:');
29 s = [c1; c2; c3; c4]
30
31 % Generate parity-check matrix and syndrome table for Hamming code
32 parmat = hammgen(m);
33 trt = syndtable(parmat);
34
35 % First received codeword
36 \text{ recd} = [0 \ 1 \ 0 \ 1 \ 0 \ 0];
37 syndrome = rem(recd * parmat', 2);
38 syndrome_de = bi2de(syndrome, 'left-msb');
39 disp(['Syndrome (decimal): ', num2str(syndrome_de)]);
40 disp(['Syndrome (binary): ', num2str(syndrome)]);
41 Error = trt(1 + syndrome_de, :);
42 corrected code = rem(Error + recd, 2);
43 disp('Corrected code for first received word:');
44 disp(corrected_code);
45
46 % Second received codeword
47 \text{ recd} = [1 \ 1 \ 0 \ 1 \ 1 \ 0 \ 1];
48 syndrome = rem(recd * parmat', 2);
49 syndrome_de = bi2de(syndrome, 'left-msb');
50 disp(['Syndrome (decimal): ', num2str(syndrome_de)]);
51 disp(['Syndrome (binary): ', num2str(syndrome)]);
52 Error = trt(1 + syndrome_de, :);
53 corrected code = rem(Error + recd, 2);
54 disp('Corrected code for second received word:');
55 disp(corrected_code);
56
```

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