

From Chapter 4 of the text:

- 4.1. Construct a generator polynomial for a 3-error correcting Reed-Solomon code of length 10 over \mathbf{Z}_{11} .
- 4.2. Construct a $[4, 2]$ Reed-Solomon code \mathcal{C} over \mathbf{Z}_5 . That is, find a generator polynomial for \mathcal{C} , a generator matrix for \mathcal{C} , and list the elements of \mathcal{C} . Find the minimum distance of \mathcal{C} ; how many errors will it correct?
- 4.5. Find a generator polynomial $g(x)$ for a $[15, 11]$ Reed-Solomon code over $\text{GF}(16)$. Use $\mathbf{Z}_2[x]/\langle x^4 + x + 1 \rangle$ as your representation of $\text{GF}(16)$, and use the primitive root $u = [x]$.
Note: the polynomial $g(x)$ is in $\text{GF}(16)[x]$, not necessarily $\mathbf{Z}_2[x]$.

Additional problems:

1. Construct a $[15, k]$ BCH code over \mathbf{Z}_2 with designed distance 5 for which k is as large as possible. What is the minimum distance of the code?
2. Construct a $[15, k]$ BCH code over \mathbf{Z}_2 with designed distance 7 for which k is as large as possible. What is the minimum distance of the code?
3. Construct a BCH code of length 8 over \mathbf{Z}_3 with designed distance 5.