```
> restart; # Example 5.1.1 from [JH] and tips for decoding it
  (example 5.2.1)
> for i from 1 to 10 do 2^i mod 11; od; #2 is primitive element in
  F_11
```

2
4
8
5
10
9
7
3
6
1

```
> x:=[]: for i from 0 to 9 do x:=[op(x),2^i mod 11]: od: x; #the
  points where we evaluate
```

[1, 2, 4, 8, 5, 10, 9, 7, 3, 6]

```
> G:=matrix(5,10,[]):
> for i from 1 to 5 do
>     for j from 1 to 10 do
>         G[i,j]:=x[j]^(i-1) mod 11:
>     od:
> od:

> evalm(G); #Generator matrix for k=5
```

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 2 & 4 & 8 & 5 & 10 & 9 & 7 & 3 & 6 \\ 1 & 4 & 5 & 9 & 3 & 1 & 4 & 5 & 9 & 3 \\ 1 & 8 & 9 & 6 & 4 & 10 & 3 & 2 & 5 & 7 \\ 1 & 5 & 3 & 4 & 9 & 1 & 5 & 3 & 4 & 9 \end{bmatrix}$$

```
> G:=matrix(5,10,[]):
> for i from 1 to 5 do
>     for j from 1 to 10 do
>         G[i,j]:=2^((i-1)*(j-1)) mod 11:
>     od:
> od:evalm(G); #Another way of defining the generator matrix
```

$$\begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 2 & 4 & 8 & 5 & 10 & 9 & 7 & 3 & 6 \\ 1 & 4 & 5 & 9 & 3 & 1 & 4 & 5 & 9 & 3 \\ 1 & 8 & 9 & 6 & 4 & 10 & 3 & 2 & 5 & 7 \\ 1 & 5 & 3 & 4 & 9 & 1 & 5 & 3 & 4 & 9 \end{bmatrix}$$

```
> for i from 1 to 10 do subs(X=x[i],X^4) mod 11; od; #we are just
  evaluating polynomials at points
```

1
5
3
4
9
1
5
3
4
9

```
> #Tips for decoding Reed-Solomon codes with Maple
> A:=matrix([]); #Define the matrix Q as in page 53, do not copy
  the numbers from page 53. Generate it using page 52.
```

$$A := array(1..0, 1..0, [\ ])$$

```
> b:=vector([0,0,0,0,0,0,0,0,0,0]);
```

$$b := \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

```
> ?Linsolve
> Q:=Linsolve(A,b) mod 11; #The first part is Q_0, the second part
  is Q_1
> #Define Q_0 and Q_1 from Q
> Divide(Q0,Q1,'g') mod 11; #the transmited word is generated by g
> #How to define a poynomial and how to evaluate it at a point
> g:=x->x^4 + x^ 3 + x^ 2 + x+ 1 mod 11;
```

$$g := x \to (x^4 + x^3 + x^2 + x + 1) \ \mathbf{mod}\ 11$$

```
> g(1);
```

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