In [1]:
```
ident_4x4:ident(4);
```

Out[1]:
$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

In [2]:
```
zero_4x1:transpose([0,0,0,0]);
```

Out[2]:
$$\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

In [3]:
```
vec_a:[1,1,0,1,1];
```

Out[3]:
$$[1,1,0,1,1]$$

In [4]:
```
m:ident_4x4;
```

Out[4]:
$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

In [5]:
```
m:addcol(zero_4x1,m);
```

Out[5]:
$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

In [6]:
```
m:addrow(m,vec_a);
```

Out[6]:
$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 \end{pmatrix}$$

In [9]:
```
gf_primitive_poly(2,5);
```

Out[9]:
$$x^5 + x^2 + 1$$

In [10]:
```
m;
```

Out[10]:
$$\begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 1 \end{pmatrix}$$

In [14]:
```
phi:charpoly(m,t^5+t^3);
```

Out[14]:
$$\left(-t^5-t^3\right)\left(\left(\left(-t^5-t^3\right)\left(-t^5-t^3+1\right)-1\right)\left(-t^5-t^3\right)^2-1\right)+1$$

In [15]:
```
phi2:expand(phi);
```

Out[15]:
$$-t^{25}-5\,t^{23}-10\,t^{21}+t^{20}-10\,t^{19}+4\,t^{18}-5\,t^{17}+6\,t^{16}+4\,t^{14}+3\,t^{13}+t^{12}+3\,t^{11}+$$

In [16]:
```
gf_primitive_poly_p(phi,2);
```

Out[16]:
true

In [17]:
```
ident_5x5:ident(5);
```

Out[17]:
$$\begin{pmatrix}1&0&0&0&0\\0&1&0&0&0\\0&0&1&0&0\\0&0&0&1&0\\0&0&0&0&1\end{pmatrix}$$

In [18]:
```
for i:1 thru 100 do if mod(m^^i,2) = ident_5x5 then print("Wow ",i);
```

```
Wow  31
Wow  62
Wow  93
```

Out[18]:
done

In [ ]:

In [ ]: