Diskret matematik, niveau 2. Genererende polynomier

```
> restart;
```

Lidt Maplemanipulation med polynomier

Genererende polynomier indtil grad 10 for de forskellige møntværdier

```
> enkrone:=x->x^10+x^9+x^8+x^7+x^6+x^5+x^4+x^3+x^2+x+1;
  tokrone:=x->x^10+x^8+x^6+x^4+x^2+1;
  femkrone:=x->x^10+x^5+1;
  tikrone:=x->1+x^10;
```

$$enkrone := x \to x^{10} + x^9 + x^8 + x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x + 1$$

$$tokrone := x \to x^{10} + x^8 + x^6 + x^4 + x^2 + 1$$

$$femkrone := x \to x^{10} + x^5 + 1$$

$$tikrone := x \to 1 + x^{10} \qquad \textbf{(1.1)}$$

At multiplicere polynomier og samle i led af samme grad gøres med expand, fx

```
> expand(enkrone(x)*
  femkrone(x));
```

$$x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + 2x^{15} + 2x^{14} + 2x^{13} + 2x^{12} + 2x^{11} + 3x^{10} + 2x^9 + 2x^8 + 2x^7 + 2x^6 + 2x^5 + x^4 + x^3 + x^2 + x + 1 \qquad \textbf{(1.2)}$$

Polynomier med mange led kan angives vha af kommandoen add, fx

```
> p1:=x->add(x^i,i=0..100);
  p1(x);
  p2:=x->add(x^(2*i),i=0..50);
  p2(x);
```

$$p1 := x \to add(x^i, i = 0..100)$$

$$x^{100} + x^{99} + x^{98} + x^{97} + x^{96} + x^{95} + x^{94} + x^{93} + x^{92} + x^{91} + x^{90} + x^{89} + x^{88} + x^{87} + x^{86} + x^{85} + x^{84} + x^{83} + x^{82} + x^{81} + x^{80} + x^{79} + x^{78} + x^{77} + x^{76} + x^{75} + x^{74} + x^{73} + x^{72} + x^{71} + x^{70} + x^{69} + x^{68} + x^{67} + x^{66} + x^{65} + x^{64} + x^{63} + x^{62} + x^{61} + x^{60} + x^{59} + x^{58} + x^{57} + x^{56} + x^{55} + x^{54} + x^{53} + x^{52} + x^{51} + x^{50} + x^{49} + x^{48} + x^{47} + x^{46} + x^{45} + x^{44} + x^{43} + x^{42} + x^{41} + x^{40} + x^{39} + x^{38} + x^{37} + x^{36} + x^{35} + x^{34} + x^{33} + x^{32} + x^{31} + x^{30} + x^{29} + x^{28} + x^{27} + x^{26} + x^{25} + x^{24} + x^{23} + x^{22} + x^{21} + x^{20} + x^{19} + x^{18} + x^{17} + x^{16} + x^{15} + x^{14} + x^{13} + x^{12} + x^{11} + x^{10} + x^9 + x^8 + x^7 + x^6 + x^5 + x^4 + x^3 + x^2 + x + 1$$

$$p2 := x \to add(x^{2i}, i = 0..50)$$

$$x^{100} + x^{98} + x^{96} + x^{94} + x^{92} + x^{90} + x^{88} + x^{86} + x^{84} + x^{82} + x^{80} + x^{78} + x^{76} + x^{74} + x^{72} + x^{70} + x^{68} + x^{66} + x^{64} + x^{62} + x^{60} + x^{58} + x^{56} + x^{54} + x^{52} + x^{50} + x^{48} + x^{46} + x^{44} + x^{42} + x^{40} + x^{38} + x^{36} + x^{34} + x^{32} + x^{30} + x^{28} + x^{26} + x^{24} + x^{22} + x^{20} + x^{18} + x^{16} + x^{14} + x^{12} + x^{10} + x^8 + x^6 + x^4 + x^2 + 1 \qquad \textbf{(1.3)}$$

Koefficienten til led af en bestemt grad i et polynomium kan findes vha. kommandoen coeff, fx

```
> coeff(enkrone(x)*femkrone(x),x,10);
```

(1.4)

► Løsning til det udfoldende spørgsmål