



Maxima 5.27.0 <http://maxima.sourceforge.net>  
 using Lisp GNU Common Lisp (GCL) GCL 2.6.7 (a.k.a. GCL)  
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 Dedicated to the memory of William Schelter.

## Décompositions en éléments simples

- ▷ F:  $(X^2+1)/((X-1)*(X-2)*(X-3));$   
 1:  $\frac{X^2+1}{(X-3)(X-2)(X-1)}$
- ▷ partfrac(F,X);  
 2:  $\frac{1}{X-1} - \frac{5}{X-2} + \frac{5}{X-3}$
- ▷ F:  $(X-2)/(X^2*(X-1));$   
 3:  $\frac{X-2}{(X-1)X^2}$
- ▷ partfrac(F,X);  
 4:  $\frac{1}{X} + \frac{2}{X^2} - \frac{1}{X-1}$
- ▷ F:  $2/(X*(X-1)^2);$   
 5:  $\frac{2}{(X-1)^2X}$
- ▷ partfrac(F,X);  
 6:  $\frac{2}{X} - \frac{2}{X-1} + \frac{2}{(X-1)^2}$
- ▷ F:  $(X^5+X^2-X+1)/(X-1)^3;$   
 7:  $\frac{X^5+X^2-X+1}{(X-1)^3}$
- ▷ partfrac(F,X);  
 8:  $X^2 + 3X + \frac{11}{X-1} + \frac{6}{(X-1)^2} + \frac{2}{(X-1)^3} + 6$
- ▷ F:  $1/(X^3+1);$   
 9:  $\frac{1}{X^3+1}$
- ▷ partfrac(F,X);  
 10:  $\frac{1}{3(X+1)} - \frac{X-2}{3(X^2-X+1)}$
- ▷ F:  $(X-2)/(X^4-1);$   
 11:  $\frac{X-2}{X^4-1}$
- ▷ partfrac(F,X);  
 12:  $-\frac{X-2}{2(X^2+1)} + \frac{3}{4(X+1)} - \frac{1}{4(X-1)}$
- ▷ F:  $(X^3+2)/(X^3*(X^4-1));$   
 13:  $\frac{X^3+2}{X^3(X^4-1)}$
- ▷ partfrac(F,X);  
 14:  $-\frac{2X+1}{2(X^2+1)} + \frac{1}{4(X+1)} - \frac{2}{X^3} + \frac{3}{4(X-1)}$
- ▷ F:  $1/(X^4+X^2+1);$   
 15:  $\frac{1}{X^4+X^2+1}$

▷ partfrac(F,X);

$$16: \frac{X+1}{2(X^2+X+1)} - \frac{X-1}{2(X^2-X+1)}$$

▷ F:4\*X^3/(X^4-1)^2;

$$17: \frac{4X^3}{(X^4-1)^2}$$

▷ partfrac(F,X);

$$18: -\frac{X}{(X^2+1)^2} - \frac{1}{4(X+1)^2} + \frac{1}{4(X-1)^2}$$

▷ F:(X^2+2\*X+5)/(X^2-3\*X+2);

$$19: \frac{X^2+2X+5}{X^2-3X+2}$$

▷ partfrac(F,X);

$$20: -\frac{8}{X-1} + \frac{13}{X-2} + 1$$

▷ F:X\*(X^6-1)/(X^2-1)^3;

$$21: \frac{X(X^6-1)}{(X^2-1)^3}$$

▷ partfrac(F,X);

$$22: \frac{3}{2(X+1)} - \frac{3}{4(X+1)^2} + X + \frac{3}{2(X-1)} + \frac{3}{4(X-1)^2}$$

▷ F:16/((X-1)^3\*(X+1)^3);

$$23: \frac{16}{(X-1)^3(X+1)^3}$$

▷ partfrac(F,X);

$$24: -\frac{3}{X+1} - \frac{3}{(X+1)^2} - \frac{2}{(X+1)^3} + \frac{3}{X-1} - \frac{3}{(X-1)^2} + \frac{2}{(X-1)^3}$$

▷ F:1/(X^3+3\*X^2+2\*X)^4;

$$25: \frac{1}{(X^3+3X^2+2X)^4}$$

▷ partfrac(F,X);

$$26: \frac{105}{32(X+2)} + \frac{41}{32(X+2)^2} + \frac{3}{8(X+2)^3} + \frac{1}{16(X+2)^4} + \frac{4}{(X+1)^2} + \frac{1}{(X+1)^4} - \frac{105}{32X} + \frac{41}{32X^2} - \frac{3}{8X^3} + \frac{1}{16X^4}$$

▷ F:(X^8+X+1)/(X^4\*(X-1)^3);

$$27: \frac{X^8+X+1}{(X-1)^3X^4}$$

▷ partfrac(F,X);

$$28: X - \frac{16}{X} - \frac{9}{X^2} - \frac{4}{X^3} - \frac{1}{X^4} + \frac{22}{X-1} - \frac{3}{(X-1)^2} + \frac{3}{(X-1)^3} + 3$$

▷ F:(X^7+1)/(X^2+X+1)^3;

$$29: \frac{X^7+1}{(X^2+X+1)^3}$$

▷ partfrac(F,X);

$$30: \frac{3X+5}{X^2+X+1} + \frac{-4X-2}{(X^2+X+1)^2} + \frac{X+1}{(X^2+X+1)^3} + X - 3$$

▷ F:(X^8+1)/((X-1)^2\*(X^3-8));

$$31: \frac{X^8+1}{(X-1)^2(X^3-8)}$$

▷ partfrac(F,X);

$$32: \frac{499X-5636}{588(X^2+2X+4)} + X^3 + 2X^2 + 3X - \frac{62}{49(X-1)} - \frac{2}{7(X-1)^2} + \frac{257}{12(X-2)} + 12$$

▷ F:(X^2+X+1)/(X^3\*(X^2+1)^2);

$$33: \frac{X^2+X+1}{X^3(X^2+1)^2}$$

▷ partfrac(F,X);

$$34: \frac{X-1}{X^2+1} - \frac{1}{(X^2+1)^2} - \frac{1}{X} + \frac{1}{X^2} + \frac{1}{X^3}$$

▷ F:X^2/(X^4 -2\*X^2\*cos(alpha)+1);

$$35 : \frac{X^2}{X^4 - 2 \cos \alpha X^2 + 1}$$

▷ `partfrac(F,X);`

$$36 : \frac{X^2}{X^4 - 2 \cos \alpha X^2 + 1}$$

**Maxima** ne parvient pas à décomposer cette dernière fraction, donnons lui un petit coup de pouce...

▷ `F:X^2/(X^4 - 2*X^2*(2*(cos(alpha/2))^2-1)+1);`

$$37 : \frac{X^2}{X^4 - 2 \left( 2 \cos^2 \left( \frac{\alpha}{2} \right) - 1 \right) X^2 + 1}$$

▷ `partfrac(F,X);`

$$38 : \frac{X}{4 \cos \left( \frac{\alpha}{2} \right) \left( X^2 - 2 \cos \left( \frac{\alpha}{2} \right) X + 1 \right)} - \frac{X}{4 \cos \left( \frac{\alpha}{2} \right) \left( X^2 + 2 \cos \left( \frac{\alpha}{2} \right) X + 1 \right)}$$