

# Décompositions en éléments simples

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> F: (X^2+1) / ((X-1)\*(X-2)\*(X-3));

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

> partfrac(F,X);

$$\frac{1}{X-1} - \frac{5}{X-2} + \frac{5}{X-3}$$

> F: (X-2) / (X^2\*(X-1));

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

> partfrac(F,X);

$$\frac{1}{X} + \frac{2}{X^2} - \frac{1}{X-1}$$

> F: 2 / (X\*(X-1)^2);

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

> partfrac(F,X);

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

> F: (X^5+X^2-X+1)/(X-1)^3;

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

> partfrac(F,X);

$$X^2 + 3X + \frac{11}{X-1} + \frac{6}{(X-1)^2} + \frac{2}{(X-1)^3} + 6$$

> F: 1/(X^3+1);

$$\frac{1}{X^3 + 1}$$

> partfrac(F,X);

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

> F: (X-2) / (X^4-1) ;

$$\frac{X-2}{X^4-1}$$

> partfrac(F,X) ;

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

> F: (X^3+2) / (X^3\*(X^4-1)) ;

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

> partfrac(F,X) ;

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

> F: 1 / (X^4+X^2+1) ;

$$\frac{1}{X^4+X^2+1}$$

> partfrac(F,X) ;

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

> F: 4\*X^3/(X^4-1)^2;

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

> partfrac(F,X);

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

> F: (X^2+2\*X+5)/(X^2-3\*X+2);

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

> partfrac(F,X);

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

> F: X\*(X^6-1)/(X^2-1)^3;

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

> partfrac(F,X);

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

> F:16/((X-1)^3\*(X+1)^3);

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

> partfrac(F,X);

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

> F:1/(X^3+3\*X^2+2\*X)^4;

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

> partfrac(F,X);

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

> F: (X^8+X+1)/(X^4\*(X-1)^3);

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

> partfrac(F,X);

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

> F: (X^7+1)/(X^2+X+1)^3;

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

> partfrac(F,X);

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

> F: (X^8+1)/((X-1)^2\*(X^3-8));

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

> partfrac(F,X);

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

> F: (X^2+X+1)/(X^3\*(X^2+1)^2);

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

> partfrac(F,X);

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

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

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

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> partfrac(F,X);
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$$\frac{X^2}{X^4 - 2 \cos \alpha X^2 + 1}$$

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

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> F:X^2/(X^4 -2*X^2*(2*(cos(alpha/2))^2-1)+1);
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$$\frac{X^2}{X^4 - 2 \left(2 \cos^2 \left(\frac{\alpha}{2}\right) - 1\right) X^2 + 1}$$

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> partfrac(F,X);
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$$\frac{X}{4 \cos \left(\frac{\alpha}{2}\right) \left(X^2 - 2 \cos \left(\frac{\alpha}{2}\right) X + 1\right)} - \frac{X}{4 \cos \left(\frac{\alpha}{2}\right) \left(X^2 + 2 \cos \left(\frac{\alpha}{2}\right) X + 1\right)}$$