Bir polinomun derecesi kadar koku vardir.
$x+1=0 \rightarrow$ tek koku var x=-1
$x^2-4=0 \rightarrow$ iki koku var x=-2, x=+2
$x^2-5=0 \rightarrow$ iki koku var x=-2.236, x=2.236
$x^2+3x+2=0 \rightarrow$ iki koku var x=-2, x=-1
$x^2+1=0 \rightarrow$ iki koku var x=i, x=-i
$x^2+4=0 \rightarrow$ iki koku var x=2i, x=-2i
$x^2+5=0 \rightarrow$ iki koku var x=-2.236i, x=2.236i
$x^2+2x+1=0 \rightarrow$ iki koku var x=-1, x=-1
$x^2=0 \rightarrow$ iki koku var x=0, x=0
$x^2-x=0 \rightarrow$ iki koku var x=0, x=1
Bir polinomun bir koku kompleks ise onun eslenigi de muhakkak koktur.
$x^2+1=0 \rightarrow$ x=-i, x=-i
$x^2+2x+2=0 \rightarrow$ x=-1-i, x=-1+i
$x^2-6x+25=0 \rightarrow$ x=3+4i, x=3-4i
$x^2+6x+25=0 \rightarrow$ x=-3+4i, x=-3-4i
$x^2+4x+13=0 \rightarrow$ x=-2+2i, x=-2-3i
$x^2-4x+13=0 \rightarrow$ x=2+2i, x=2-3i

Pay ve paydasi polinom olan kesirlere rasyonel kesirler denir. Bir rasyonel kesir paydanin koku kadar basit kesirlere ayrilabilir.

$$\frac{a_n x^n + a_{n-1}x^{n-1} .... + a_1 x + a_0}{x^m + b_{m-1}x^{m-1} .... + b_1 x + b_0} = \frac{a_n x^n + a_{n-1}x^{n-1} .... + a_1 x + a_0}{(x+x_1)(x+x_2)....(x+x_m)}$$

$$= \frac{A_1}{x+x_1} + \frac{A_2}{x+x_2} + ... + \frac{B_1}{x+x_5} + \frac{B_2}{(x+x_5)^2} + \frac{B_2}{(x+x_5)^3} + ...$$

A ve B lerin toplami m adet
Ornekler

$$\frac{5x+7}{x^2+3x+2} = \frac{2}{x+1} + \frac{3}{x+2},$$ [usler,kok,bolum] = residue ([5 7] , [1 3 2])

$$\frac{5x-7}{x^2-3x+2} = \frac{2}{x-1} + \frac{3}{x-2}$$ [usler,kok,bolum] = residue ([5 -7] , [1 -3 2])

$$\frac{2x+1}{x^2+3x+2} = \frac{3}{x+2} + \frac{-1}{x+1},$$

Kokler kompleks ise carpanlara ayirma isleminde paya gelen terimler de kompleks ve esleniktir.

$$\frac{6x+20}{x^2+4x+5} = \frac{3+4i}{x+2+i} + \frac{3-4i}{x+2-i},$$ $$\frac{6x-4}{x^2-4x+5} = \frac{3+4i}{x-2+i} + \frac{3-4i}{x-2-i}$$

$$\frac{10x-32}{x^2-4x+8}=\frac{5+3i}{x-2-2i}+\frac{5-3i}{x-2+2i}$$

$$\frac{10x-8}{x^2-4x+8}=\frac{5-3i}{x-2-2i}+\frac{5+3i}{x-2+2i}$$

$$\frac{14x^2-74x+72}{x^3-9x^2+28x-40}=\frac{5-3i}{x-2-2i}+\frac{5+3i}{x-2+2i}+\frac{4}{x-5}$$

[usler,kok,bolum] = residue ([14 -74 72] , [1 -9 28 -40])

$$\frac{14x^2+26x-8}{x^3+x^2-12x+40}=\frac{5-3i}{x-2-2i}+\frac{5+3i}{x-2+2i}+\frac{4}{x+5}$$

$$\frac{16x^3+42x^2-6x+72}{x^4+2x^3-11x^2+28x+40}=\frac{5-3i}{x-2-2i}+\frac{5+3i}{x-2+2i}+\frac{4}{x+5}+\frac{2}{x+1}$$

$$\frac{12x^3-106x^2+434x-440}{x^4-10x^3+57x^2-148x+200}=\frac{5-3i}{x-2-2i}+\frac{5+3i}{x-2+2i}+\frac{1+3i}{x-3-4i}+\frac{1-3i}{x-3+4i}$$

$$=\frac{10x-8}{x^2-4x+8}+\frac{2x-30}{x^2-6x+25}$$

$$\frac{3x+1}{x^2-2x+1}=\frac{3}{x-1}+\frac{4}{(x-1)^2},$$

[usler,kok,bolum] = residue ([3 1] , [1 -2 1])

$$\frac{7x+9}{x^2+2x+1}=\frac{7}{x+1}+\frac{2}{(x+1)^2}$$

$$\frac{10x}{x^2+2x+1}=\frac{10}{x+1}+\frac{-10}{(x+1)^2}$$

$$\frac{17x^5-282x^3-153x^2+1172x+344}{x^6-4x^5-15x^4+50x^3+100x^2-168x-288}=\frac{1}{x+2}+\frac{5}{(x+2)^2}+\frac{6}{(x+2)^3}$$

$$+\frac{7}{x-3}+\frac{8}{(x-3)^2}+\frac{9}{(x-4)}$$