Lineer denklem Takiminin Cozumu

12)Lineer denklem takiminin cozumu

2x+4y=10

3x+5x=13

$$\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 10 \\ 13 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 2 & 4 \\ 3 & 5 \end{bmatrix}^{-1}\begin{bmatrix} 10 \\ 13 \end{bmatrix}$$

```
>> aa=[2   4;   3   5 ];
   b=[ 10;   13];
   qq=inv(aa)*b
qq=
   1.000
   2.000
```

Yani denklemin cozumu, x=1, y=2 dir

14)

2x+3y+4z=31

4x+5x+6z=51

x+5x+7z=48

$$\begin{bmatrix} 2 & 3 & 4 \\ 4 & 5 & 6 \\ 1 & 5 & 7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 31 \\ 51 \\ 48 \end{bmatrix}$$

```
>> a= [2 3 4; 4 5 6; 1 5 7]; b=[31;  51;  48]; q=inv(a)*b
q=
   2.000
   5.000
   3.000
```

Yani x=2, y=5, z=3

15)A matrisinin satirlarinin bagimli olmasi

x+3y=10

2x+6x=20

$$\begin{bmatrix} 1 & 3 \\ 2 & 6 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 10 \\ 20 \end{bmatrix}$$

```
>> a= [1 3 ; 2  6]; b=[10;  20;];  q=inv(a)*b
```

Warning: Matrix is singular to working precision.

```
q =
   Inf
   Inf
```

A matrisinin satirlari lineer bagimli. A matrisinin tersi yok.

16)

x+2y+3z=10

4x+5y+6z=20

7x+8y+9z=30

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}=\begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix}$$

```
>> a= [1 2 3 ; 4 5 6; 7 8  9]; b=[10; 20;  30]; q=inv(a)*b
```

Warning: Matrix is close to singular or badly scaled.
Results may be inaccurate. RCOND = 1.541976e-018.

```
q =
    0
   32
    0
```

Gorunuste x=0, y=32, z=0 buldu. Fakat bu tamamen yanlis. A matrisinin satirlari lineer bagimli. A matrisinin tersi yok.

SOLVE fonksiyonu

34) x+1=0, denklemini cozun.

```
>> q=solve(' x+1=0')
  q=-1
```

NOT: x+1=0, denklemi cozuldu. cikan sonuc x degiskenine degil, q degiskenine atandi.

```
35) >> x=solve(' x+1=0')
  x=-1
```

36) **$x^2-4=0$**

```
  >> x=solve(' x^2-4=0')
  x=-2
  x=2
```

37) **$x^2-5=0$**

```
>> x=solve(' x^2-5=0')
 x= 5^(1/2)
 x= -5^(1/2)
>>x=double(x)
 x=2.2361
 x=-2.2361
```

```
38)>> x=solve(' x^2+1=0')
  x=- i
  x= i
```

```
38)>> x=solve(' x^2+2=0')
   x= -2^(1/2)*i
   x= 2^(1/2)*i
 >>x=double(x)
```

x=0 + 1.4142 **i**

x=0 - 1.4142 **i**

```
39)>> x=solve(' x^2+4*x+13=0')
  x= - 3*i - 2
  x=  3*i - 2

40) >> x=solve(' x^2+5*x+12=0')
x =
   - 5/2 - (23^(1/2)*i)/2
   - 5/2 + (23^(1/2)*i)/2
>> x=double(x)
   x=
  -2.5000 - 2.3979i
  -2.5000 + 2.3979i

41) >> x=solve('exp(x)-2=0')
x = log(2)
>> x=double(x)
x=0.6931

42) >> x=solve(' exp(x+2)-2=0')
x =log(2) – 2
>> x=double(x)
 x= -1.30
```

44) $e^{x^2+2.52x}-12x=0$

```
>> x=solve(' exp(x^2+2.52*x)-12=0')
```

x= 0.75804525464321545532000823

x= -3.27804525464321545532000823

51) x+y=5

x-y=1

```
>> [x,y]=solve('x+y=5', 'x-y=1')
     x=3
     y=2
```

52) x+3y=5

4x-y=9

```
>> [x,y]=solve('x+3*y=5', '4*x-y=9')
```

x = 32/13

y = 11/13

```
>> x=double(x), y=double(y)
```

x=2.4615

y= 0.8462

53) x +1.1y=5.3

1.3 x- y=1.7

```
>> [x,y]=solve('x+1.1*y=5.3', '1.3*x-y=1.7')
   x= 2.95061728395061728
   y= 2.13580246913580246
```

54) x^2+3y=5

4x-y=9

```
>> [x,y]=solve('x^2+3*y=20', '4*x-y=9'),
```

x = 83^(1/2) - 6

x= - 83^(1/2) - 6

y = 4*83^(1/2) - 33

y= - 4*83^(1/2) - 33

```
>>x=double(x), y=double(y)
```

x = 3.1104

x= -15.1104

y = 3.4417

y= -69.4417

¤	x	y
Birinci kok	3.1104	3.4417
Ikinici Kok	-15.1104	-69.4417

roots Fonksiyonu

Polinomun koklerini bulur.

61) x+5=0,

```
 >>q=roots( [1 5] )
```

q=-5

62) x^2+3x+2=0,

```
 >>q=roots( [1 3 2] )
```

q=-1

q=-2

63) x^2-4=0,

```
 >>q=roots( [1 0  -4] )
```

q=2

q=-2

64) x^2+4=0,

```
 >>q=roots( [1 0 4] )
```

q=0 + 2i

q=0 - 2i

65) x^2+2=0,

```
 >>q=roots( [ 1 0 2 ] )
```

q=0 + 1.4142i

q=0 - 1.4142i

66) x^3 - $6x^2$ + 11x -6=0,

```
>> q=roots( [ 1  -6 11 -6 ] )
q =
   3.0000
   2.0000
   1.0000
```

67) x^3 + x^2 –x -1=0,

```
>>  q=roots( [ 1  1 -1 -1] )
 q =
   1.0000
  -1.0000
```

-1.0000

68) $x^7 + 1 = 0$,

```
> q=roots( [ 1  0 0 0 0 0 0 1] )
q =
 -1.0000
 -0.6235 + 0.7818i
 -0.6235 - 0.7818i
  0.2225 + 0.9749i
  0.2225 - 0.9749i
  0.9010 + 0.4339i
  0.9010 - 0.4339i
```

poly Fonksiyonu

Kokleri verilen Polinomu olusturu.

71) koku 5 olan polinom nedir.

```
 >>q=poly(5)
q= [1 -5]
```

Aranan polinom: x-5

x-5=0 polinomunun koku x=5 dir.

72) koku 5 ve 3 olan polinom nedir.

```
 >>q=poly( [ 3  5 ] )
q=
  1    -8    15
```

Aranan polinom: $x^2-8x+15$

$x^2-8x+15=0$ polinomunun kokleri x=3 ve x=5 dir.

73) kokleri 2i ve -2i olan polinom nedir.

```
 >>q=poly( [ 2*i  -2i ] )
q=
   1    0   4
```

Aranan polinom: $x^2 + 4$

$x^2 + 4 = 0$ polinomunun kokleri x=2i ve x=-2i dir.

74) kokleri 3+2i ve 3-2i olan polinom nedir.

```
 >> q=poly( [ 3+2*i    3-2i ] )
q=
   1    -6   13
```

Aranan polinom: $x^2 +6x+13$

$x^2 +6x+13 = 0$ polinomunun kokleri x=3+2i ve x=3-2i dir.

75) kokleri 1,2,3,4,5,6 olan polinom nedir.

```
 >> q=poly( [1,2,3,4,5,6 ] )
q=
1   -21    175  -735   1624  -1764   720
```

$x^6 -21 x^5 +175 x^4 -735 x^3 +1624 x^2 -1764x +720$

76)

```
>> q=poly( [ 1+2i  1-2i  -3+4i  -3-4i   5   -2] )
q=
 1  1   -4   -114    5   -175  -1250
```

$x^6 - x^5 -4 x^4 -114 x^3 +5 x^2 -175x -1250$

eval Fonksiyonu

karakterlerden olusan bir ifadeyi hesaplar.

81)

```
 >> qq= ' ww=x+3 ' ;
 >>  x=10;  eval(qq);
       ww=
             13
```

82)

```
 >> qq= ' ww=x+3 ' ;
 >>  x=300;  eval(qq);
       ww=
             303
```

83)

```
 >> qq= ' ww=x*3 ' ;
 >>  x=300;  eval(qq);
       ww=
             900
```

83)

```
 >> qq= ' ww=x/3 ' ;
 >>  x=300;  eval(qq);
       ww=
            100
```

84)

```
 >> qq= ' ww=x*sin(4*x+5) ' ;
 >>  x=2;  eval(qq);
       ww=
```

85)

```
  >> qq= ' ww=x*sin(4*x+5) ' ;  x=2;  eval(qq);
      ww=
            0.84

 >> x=3;  eval(qq);
      ww=
            -2.88

 >> x=3.6;  eval(qq);
      ww=
            1.88

>> x=0;  eval(qq);
   ww=
            0
```

residue Fonksiyonu

Rasyonel fonksiyonlari kesirlere ayirir

121) $\frac{5x+7}{x^2+3x+2}=\frac{2}{x+1}+\frac{3}{x+2}$,

```
>> [usler,kok,bolum] = residue ( [5 7] , [1 3 2] )
  usler =    3       2
  kok =   -2    -1
  bolum = [ ]
```

123) $\frac{5x-7}{x^2-3x+2}=\frac{2}{x-1}+\frac{3}{x-2}$

```
 >> [usler,kok,bolum] = residue ( [5 -7] , [1 -3 2] )
usler =
    3
    2
kok =
    2
    1
```

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

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

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

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

```
[usler,kok,bolum] = residue ( [6 20] , [1   4   5] )
usler =
  3.0000 - 4.0000i
  3.0000 + 4.0000i
kok =
 -2.0000 + 1.0000i
 -2.0000 - 1.0000i
bolum =  []
```

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

```
>> [usler,kok,bolum] = residue ( [6  -4] , [1  -4  5] )
usler =
    3.0000 - 4.0000i
    3.0000 + 4.0000i
kok =
   2.0000 + 1.0000i
   2.0000 - 1.0000i
bolum =
    []
```

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

```
[usler,kok,bolum] = residue ( [14  -74  72 ] , [ 1  -9  28  -40  ] )
usler =
   4.0000
   5.0000 - 3.0000i
   5.0000 + 3.0000i
kok =
   5.0000
   2.0000 + 2.0000i
   2.0000 - 2.0000i
bolum = []
```

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

```
>> [usler,kok,bolum] = residue ( [16  42 -6 72  ] , [ 1 2 -11 28 40])
usler =
   4.0000
   5.0000 - 3.0000i
   5.0000 + 3.0000i
   2.0000
kok =
  -5.0000
   2.0000 + 2.0000i
   2.0000 - 2.0000i
  -1.0000
bolum =[]
```

132) $\frac{x^2+4x+2}{x^2-7x+12}=1+\frac{34}{x-4}+\frac{-23}{x-3}$

```
>> [usler,kok,bolum] = residue ( [1 4 2] , [1 -7 12 ] )
usler =
     34
    -23
```

```
kok =
    4
    3
bolum =
    1
```

133)

$$\frac{5x^4-33x^3+50x^2-x+38}{x^2-7x+12}=5x^2+2x+4+\frac{2}{x-4}+\frac{1}{x-3}$$

```
>>[us,kok,bol] = residue(py,pd)
us =
    2
    1
kok =
    4
    3
bol =
    5    2    4
```

SEMBOLIK ISLEMLER

```
Asagidaki satirlar ayni islemi yaparlar.
syms a b c x ;
a=sym('a'), b=sym('b'),c=sym('c'),d=sym('d')
```

141) ax+b=c, x=?

```
syms a b c x ;    q=solve('a*x+b=c')
  q=
     -(b - c)/a
```

143) $ax^2=c$, x=?

```
>> syms a c x ;    q=solve('a*x^2=c')
  q =
     c^(1/2)/a^(1/2)
    -c^(1/2)/a^(1/2)

>>pretty(q)
+-          -+
|     1/2    |
|    c       |
|    ----    |
|     1/2    |
|    a       |
|            |
|      1/2   |
|     c      |
|   - ----   |
|      1/2   |
|     a      |
+-          -+
```

151)

$$q=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

matrisinin determinatini ve tersini alin.

```
a=sym('a'), b=sym('b'), c=sym('c'), d=sym('d'),
q=[a b;  c d],  qii=inv(q),    qtt= det(q)

qii=
  [  d/(a*d - b*c), -b/(a*d - b*c)]
  [ -c/(a*d - b*c),  a/(a*d - b*c)]
qtt=
   a*d - b*c
```

simplify, expand, factor, collect, simple, numden

$S=\dfrac{x^2+5x+6}{x+2}$ ifadesinin sade şeklini belirtiniz.

```
>> syms x
>> S = (x^2+5*x+6)/(x+2)
S =
(x^2+5*x+6)/(x+2)

>> simplify(S)
ans =
x+3
```

$T=\dfrac{1-x^2}{1-x}$ ifadesinin sade

```
>> T = (1-x^2)/(1-x)
T =
(x^2+5*x+6)/(x+2)

>> simplify(T)
ans =
x+1
```

factor: carpanlara ayirmada kullanilir.