## Basic Algebraic Equations

The **solve** function is used for solving algebraic equations. In its simplest form, the solve function takes the equation enclosed in quotes as an argument.

For example, let us solve for x in the equation x-5 = 0

solve('x-5=0')

## Solving Higher Order Equations

The **solve** function can also solve higher order equations. For example, let us solve a cubic equation as (x-3)2(x-7) = 0

solve('(x-3)^2\*(x-7)=0')

MATLAB will execute the above statement and return the following result −

ans =

3

3

7

The following example solves the fourth order equation x4 − 7x3 + 3x2 − 5x + 9 = 0.

Create a script file and type the following code −

eq = 'x^4 - 7\*x^3 + 3\*x^2 - 5\*x + 9 = 0';

s = solve(eq);

disp('The first root is: '), disp(s(1));

disp('The second root is: '), disp(s(2));

disp('The third root is: '), disp(s(3));

disp('The fourth root is: '), disp(s(4));

% converting the roots to double type

disp('Numeric value of first root'), disp(double(s(1)));

disp('Numeric value of second root'), disp(double(s(2)));

disp('Numeric value of third root'), disp(double(s(3)));

disp('Numeric value of fourth root'), disp(double(s(4)));

When you run the file, it returns the following result −

The first root is:

6.630396332390718431485053218985

The second root is:

1.0597804633025896291682772499885

The third root is:

- 0.34508839784665403032666523448675 - 1.0778362954630176596831109269793\*i

The fourth root is:

- 0.34508839784665403032666523448675 + 1.0778362954630176596831109269793\*i

Numeric value of first root

6.6304

Numeric value of second root

1.0598

Numeric value of third root

-0.3451 - 1.0778i

Numeric value of fourth root

-0.3451 + 1.0778i

## Solving System of Equations in MATLAB

The **solve** function can also be used to generate solutions of systems of equations involving more than one variables. Let us take up a simple example to demonstrate this use.

Let us solve the equations −

5x + 9y = 5

3x – 6y = 4

Create a script file and type the following code −

s = solve('5\*x + 9\*y = 5','3\*x - 6\*y = 4');

s.x

s.y

When you run the file, it displays the following result −

ans =

22/19

ans =

-5/57

In same way, you can solve larger linear systems. Consider the following set of equations −

x + 3y -2z = 5

3x + 5y + 6z = 7

2x + 4y + 3z = 8