Operators

Operators in MATLAB

In MATLAB, operators are used to perform arithmetic and logical operations on data. Here are some common operators in MATLAB:

1. Arithmetic Operators:

  - Addition: +

  - Subtraction: -

  - Multiplication: *

  - Division: /

  **- Integer division: **

  - Exponentiation: ^

  - Square root: sqrt()

  - Modulus: mod()

  - Absolute value: abs()

```matlab
% Addition
a = 5 + 3; % a = 8

% Subtraction
b = 10 - 4; % b = 6

% Multiplication
c = 2 * 6; % c = 12

% Division
d = 15 / 3; % d = 5

% Exponentiation
e = 2 ^ 4; % e = 16

% Modulus
f = mod(17, 5); % f = 2

% Absolute value
g = abs(-8); % g = 8
```

2. Logical Operators:

  - Equality: ==

  - Inequality: ~=

  - Greater than: >

  - Less than: <

  - Greater than or equal to: >=

  - Less than or equal to: <=

  - Logical AND: &

  - Logical OR: |

  - Logical NOT: ~

```matlab
% Equality
a = 5 == 5; % a = logical 1 (true)

% Inequality
b = 10 ~= 5; % b = logical 1 (true)

% Greater than
c = 7 > 3; % c = logical 1 (true)

% Less than
d = 2 < 5; % d = logical 1 (true)

% Logical AND
e = (4 > 2) & (6 < 10); % e = logical 1 (true)

% Logical OR
f = (3 == 5) | (7 > 10); % f = logical 0 (false)
```

3. Logical Operators for Arrays and Logical Arrays:

  - **Element-wise AND: &**

  - **Element-wise OR: |**

  - **Array logical NOT: ~**

4. Array Operators:

  - **Matrix multiplication: ***

  - **Matrix right division: **

  - **Matrix addition: +**

  - **Matrix subtraction: -**

  - **Subscripting for value substitution: (:)**

```
% Matrix multiplication
A = [1 2; 3 4];
B = [5 6; 7 8];
C = A * B; % C = [19 22; 43 50]

% Matrix right division
D = B \ C; % D = [1 2; 3 4]

% Matrix addition
E = A + B; % E = [6 8; 10 12]

% Matrix subtraction
F = B - A; % F = [4 4; 4 4]

% Subscripting for value substitution
G = [1 2 3 4];
G(2:3) = [7 8]; % G = [1 7 8 4]
```

operator precedence in MATLAB:

1. Parentheses: Operations within parentheses are performed first.

2. Exponentiation and Square Root: Operations involving exponentiation (highest precedence) and square root come after parentheses.

3. Multiplication and Division: Operations involving multiplication and division come after exponentiation and square root.

4. Addition and Subtraction: Operations involving addition and subtraction come after multiplication and division.

A program used to calculate the value of the expression (4 + 6) * 2

result = (4 + 6) * 2; disp(result);

% The value will appear as 20

A program used to calculate the value of the expression 4 + 6 * 2 / 3 - 1

a = 4 + 6 * 2 / 3 - 1;

disp(a);

% The value will appear as 7.6667