

Operators



Important

- **x** and **y** represent numerical values or variables.
- **m**, **n**, and **p** represent integer values or variables.
- **a** and **b** represent boolean values or variables.
- **U** and **V** represent matrices of numerical values.
- **A** and **B** represent matrices of boolean values.

Arithmetic operators

Operator	Operator name	Syntax
+	Addition	$x+y$ $U + V$ (U and V are $m \times n$ matrices)
-	Subtraction	$x-y$ $U - V$ (U and V are $m \times n$ matrices)
*	Multiplication	$x*y$ $U*V$ (U is an $m \times n$ matrix and V is an $n \times p$ matrix)
/	Division	x/y
%	Modulus	$m \% n$ $U \ \% \ V$ (U and V are $m \times n$ matrices of integer values). This operator operates element-wise on matrices.
!	Factorial	$m!$
^	Power	x^y
\	Left division	$x \backslash y$ is equivalent to $(1/x) * y$ $U \backslash V$ (U and V are $m \times n$ matrices) is equivalent to $(1/U) * V$
.*	Element-wise multiplication	$U .* V$ (U and V are $m \times n$ matrices)
./	Element-wise division	$U ./ V$ (U and V are $m \times n$ matrices)
.\	Element-wise left division	$U . \backslash V$ (U and V are $m \times n$ matrices) is equivalent to $(1/U) .* V$
.^	Element-wise power	$U .^ V$ (U and V are $m \times n$ matrices)



Note

An Element-wise operator performs an operation on each pair of Elements, which is in the same location, of the operand matrices.

Assignment operators

Operator	Operator name	Syntax
=	Assignment	$x=y$ $a=b$ $U=V$

Comparison operators

Operator	Operator name	Syntax
>	Greater	$x > y$ $U > V$
<	Less	$x < y$ $U < V$
>=	Greater or Equal	$x \geq y$ $U \geq V$
<=	Less of Equal	$x \leq y$ $U \leq V$
==	Equality	$x == y$ $a == b$ $U == V$
!=	Inequality	$x != y$ $a != b$ $U != V$



All comparison operators operate Element-wise on matrices in the example as follows

```
A = [1; 2; 3]
B = [3; 2; 1]
```

```
Then
A>B is [false; false; true];
```

Boolean operators

Operator	Operator Name	Syntax
!	NOT	$!a$ $!A$
&	AND	$a \& b$ $A \& B$
	OR	$a b$ $A B$
^	XOR (exclusive OR)	$a \wedge b$ $A \wedge B$



Important

All boolean operators operate element-wise on matrices in the example as follows

```
A = [true; true; false; false];
B = [true; false; true; false];
```

```
Then
A&B is [true; false; false; false];
```