

MATLAB: Analysis and Visualization with Vectors, Performing calculations with vectors, Creating multiple plots

Vector is a one-dimensional array of numbers. MATLAB allows creating two types of vectors:

- Row vectors
- Column vectors

Row Vectors

Row vectors are created by enclosing the set of elements in square brackets, using space or comma to delimit the elements.

```
r = [7 8 9 10 11]
```

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

```
r =
```

```
7 8 9 10 11
```

Column Vectors

Column vectors are created by enclosing the set of elements in square brackets, using semicolon to delimit the elements.

```
c = [7; 8; 9; 10; 11]
```

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

```
c =
```

```
7
```

```
8
```

```
9
```

```
10
```

```
11
```

Referencing the Elements of a Vector

You can reference one or more of the elements of a vector in several ways. The *i*th component of a vector *v* is referred as *v* (*i*). For example:

```
v = [ 1; 2; 3; 4; 5; 6]; % creating a column vector of 6 elements
```

```
v(3)
```

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

```
ans =
```

```
3
```

When you reference a vector with a colon, such as *v*(:), all the components of the vector are listed.

```
v = [ 1; 2; 3; 4; 5; 6]; % creating a column vector of 6 elements
```

```
v(:)
```

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

```
ans =
```

```
1
```

```
2
```

```
3
```

```
4
```

```
5
```

```
6
```

MATLAB allows you to select a range of elements from a vector.

For example, let us create a row vector *rv* of 9 elements, then we will reference the elements 3 to 7 by writing *rv* (3:7) and create a new vector named *sub_rv*.

```
rv = [1 2 3 4 5 6 7 8 9];
```

```
sub_rv = rv (3:7)
```

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

sub_rv =

3 4 5 6 7

Vector Operations

One can add or subtract two vectors. Both the operand vectors must be of same type and have same number of elements.

Example

Create a script file with the following code:

```
A = [7, 11, 15, 23, 9];
```

```
B = [2, 5, 13, 16, 20];
```

```
C = A + B;
```

```
D = A - B;
```

```
disp (C);
```

```
disp (D);
```

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

```
9 16 28 39 29
```

```
5 6 2 7 -11
```