

# ML-7

## Tensors

it is a data structure . it is basically a container for numbers.

vectors or matrix are tensors.

## 0D tensor/ Scalar

whenever we are storing a single number . These are basically called scalars or we can call them 0D tensor.

0D tensor means that it has 0 dimension .

```
[8] import numpy as np
```

```
[9] a = np.array(4)
```

```
[10] a
```

```
array(4)
```

```
▶ a.ndim I
```

```
☞ 0
```

## 1D tensor / vector

if the dimension is one . we can say it as 1 dimensional tensors.

```
▶ arr = np.array([1,2,3,4])
```

```
[13] arr
```

```
array([1, 2, 3, 4])
```

```
[14] arr.ndim
```

```
1
```

1D tensor → vector

vector → 4 dimensions

## 2D tensor

```
[15] mat = np.array([[1,2,3],[4,5,6],[7,8,9]])
```

```
[16] mat
```

```
array([[1, 2, 3],  
       [4, 5, 6],  
       [7, 8, 9]])
```

```
▶ mat.ndim
```

```
📄 2
```

## Rank , Axis and shape

Rank is the no. of dimensions which is equal to the no. of axis .

Rank=Axis=no. of dim

**shape** gives the number of rows and columns in the tensor.

size of tensor=no. of rows \* no. of columns