

# Neural Networks: Unrolling Parameters

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Unrolling our parameters  $\Theta$  from matrices into vectors will be necessary when using more advanced optimization algorithms other than gradient descent. In Python, there are two methods that you can use to flatten a matrix (multi-dimensional array): *flatten()* and *ravel()*

## Create a Matrix

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Input:

```
import numpy as np

matrix = np.array([[ 1,  2,  3,  4,  5 ],
                   [ 6,  7,  8,  9, 10 ],
                   [11, 12, 13, 14, 15 ],
                   [16, 17, 18, 19, 20 ],
                   [21, 22, 23, 24, 25]])

matrix
```

Output:

```
array([[ 1,  2,  3,  4,  5],
       [ 6,  7,  8,  9, 10],
       [11, 12, 13, 14, 15],
       [16, 17, 18, 19, 20],
       [21, 22, 23, 24, 25]])
```

## Unravel Into a Vector

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```
vector = matrix.flatten()
vector
```

Output:

```
array([ 1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16, 17,
       18, 19, 20, 21, 22, 23, 24, 25])
```

## Reshape Back to Matrix

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Input:

```
vector.reshape(5, 5)
```

Output:

```
array([[ 1,  2,  3,  4,  5],  
       [ 6,  7,  8,  9, 10],  
       [11, 12, 13, 14, 15],  
       [16, 17, 18, 19, 20],  
       [21, 22, 23, 24, 25]])
```

[https://www.python-course.eu/numpy\\_changing\\_dimensions.php](https://www.python-course.eu/numpy_changing_dimensions.php)