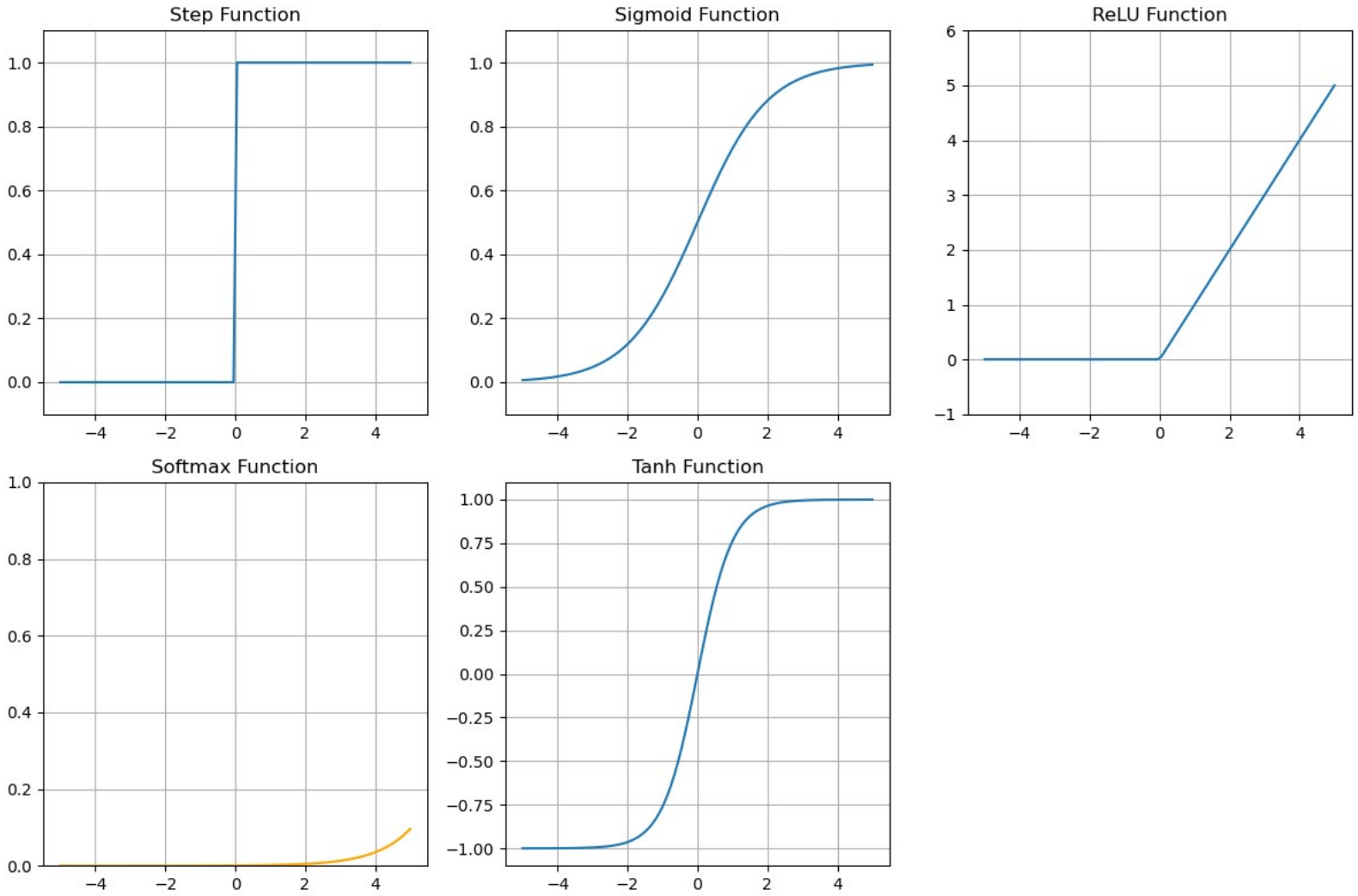
In [6]:

```
import numpy as np
import matplotlib.pyplot as plt
def step_function(x):
    return np.where(x < 0, 0, 1)
def sigmoid_function(x):
    return 1 / (1 + np.exp(-x))
def relu_function(x):
    return np.maximum(0, x)
def softmax_function(x):
    exp_x = np.exp(x - np.max(x))
    return exp_x / np.sum(exp_x)
def tanh_function(x):
    return np.tanh(x)
x = np.linspace(-5, 5, 100)
step_values = step_function(x)
sigmoid_values = sigmoid_function(x)
relu_values = relu_function(x)
softmax_values = softmax_function(x)
tanh_values = tanh_function(x)
plt.figure(figsize=(12, 8))
plt.subplot(2, 3, 1)
plt.title("Step Function")
plt.plot(x, step_values)
plt.ylim(-0.1, 1.1)
plt.grid()
plt.subplot(2, 3, 2)
```

```
plt.title("Sigmoid Function")
plt.plot(x, sigmoid_values)
plt.ylim(-0.1, 1.1)
plt.grid()
plt.subplot(2, 3, 3)
plt.title("ReLU Function")
plt.plot(x, relu_values)
plt.ylim(-1, 6)
plt.grid()

plt.subplot(2, 3, 4)
plt.title("Softmax Function")
plt.plot(x, softmax_function(x), label='Softmax', color='orange')
plt.ylim(0, 1)
plt.grid()
plt.subplot(2, 3, 5)
plt.title("Tanh Function")
plt.plot(x, tanh_values)
plt.ylim(-1.1, 1.1)
plt.grid()
plt.tight_layout()
plt.show()
```


Step Function
Sigmoid Function
ReLU Function
Softmax Function
Tanh Function

In [7]:

```
import numpy as np
class Neuron:
    def __init__(self, n_inputs):
        self.weights = np.random.rand(n_inputs)
        self.bias = np.random.rand(1)
    def sigmoid(self, x):
        return 1 / (1 + np.exp(-x))
    def feedforward(self, inputs):
        weighted_sum = np.dot(self.weights, inputs) + self.bias
        return self.sigmoid(weighted_sum)
if __name__ == "__main__":
    neuron = Neuron(n_inputs=3)
    inputs = np.array([0.5, 0.3, 0.2])
    output = neuron.feedforward(inputs)
    print("Weights:", neuron.weights)
    print("Bias:", neuron.bias)
    print("Inputs:", inputs)
    print("Output:", output)
```

```
Weights: [0.08530311 0.12368734 0.61701969]
Bias: [0.01861768]
Inputs: [0.5 0.3 0.2]
Output: [0.5552187]
```

In [ ]: