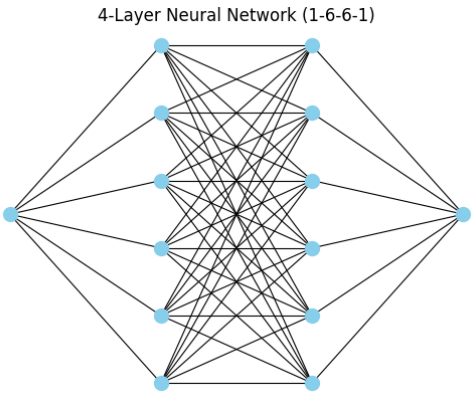
Programming assignment

Method:

1.activation function: σ(x) = tanh(x)

2.Network:



(1)Input layer: 1 neuron

(2)Inside layer: 2 layers, 6 neurons

(3)Output layer: 1 neuron

3.Choosen Points:

Randomly choose at [-1,1]

(1)Training: 10000

(2)Validation: 1500

4.loss function: MSE loss

5.optimizer: Adam

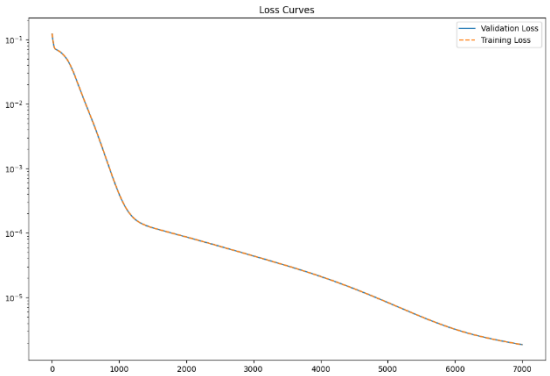
6.learning rate: 0.001

7.Epoch: 8000 times

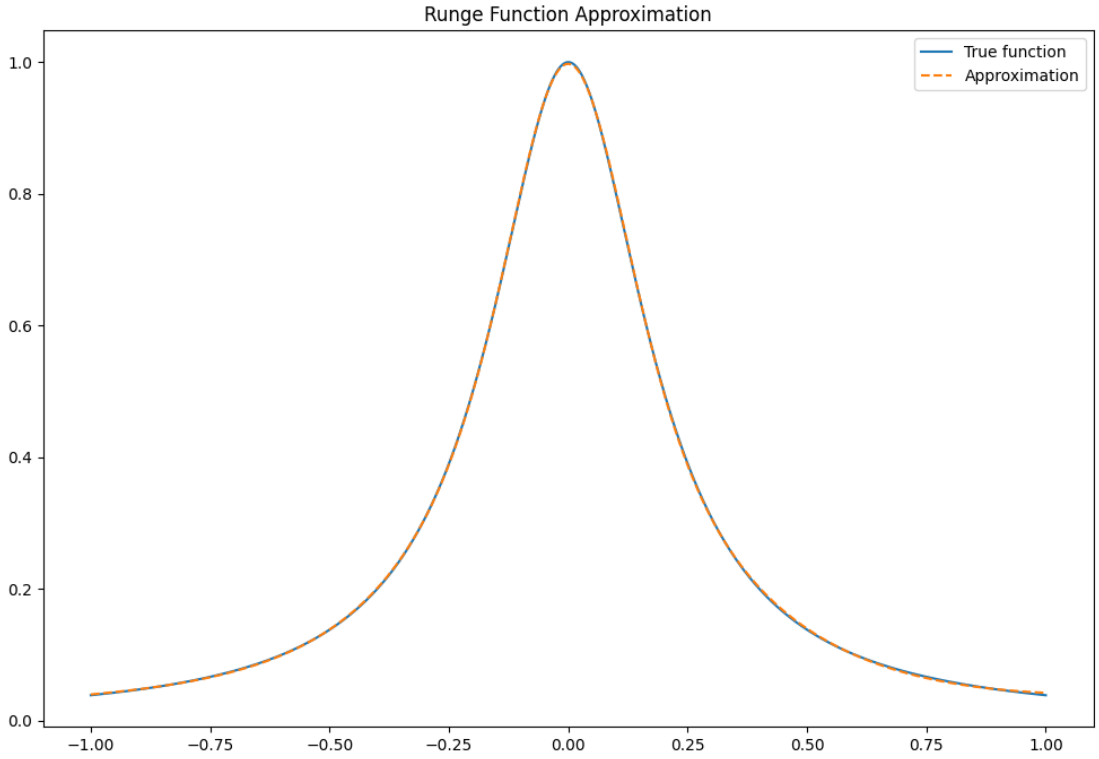
Result:

Training loss

```
Epoch    0 | Train Loss: 0.122808 | Val Loss: 0.120374
Epoch  500 | Train Loss: 0.010055 | Val Loss: 0.009992
Epoch 1000 | Train Loss: 0.000399 | Val Loss: 0.000397
Epoch 1500 | Train Loss: 0.000120 | Val Loss: 0.000120
Epoch 2000 | Train Loss: 0.000087 | Val Loss: 0.000087
Epoch 2500 | Train Loss: 0.000062 | Val Loss: 0.000062
Epoch 3000 | Train Loss: 0.000044 | Val Loss: 0.000044
Epoch 3500 | Train Loss: 0.000031 | Val Loss: 0.000031
Epoch 4000 | Train Loss: 0.000021 | Val Loss: 0.000021
Epoch 4500 | Train Loss: 0.000014 | Val Loss: 0.000014
Epoch 5000 | Train Loss: 0.000008 | Val Loss: 0.000008
Epoch 5500 | Train Loss: 0.000005 | Val Loss: 0.000005
Epoch 6000 | Train Loss: 0.000003 | Val Loss: 0.000003
Epoch 6500 | Train Loss: 0.000002 | Val Loss: 0.000002
Epoch 7000 | Train Loss: 0.000002 | Val Loss: 0.000002
```



Result:



MSE and Max error:

MSE: 0.000002

Max Error: 0.003585