Meeting

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Progress report

- Install tensorflow package for python.
- Try two cases for using Keras API.

Result

Target function:

$$f(x) = x^2$$

First case:

- Two hidden layers
- Each for 20 neuros
- Sigmoid function

Second case:

- Two hidden layers
- Each for 64 neuros
- Sigmoid function

Database:

- Input range: $[0, 10)$

- 1,000,000 random datas
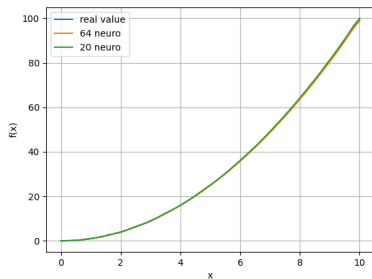
- Split into 1000 groups

- Train 50 times
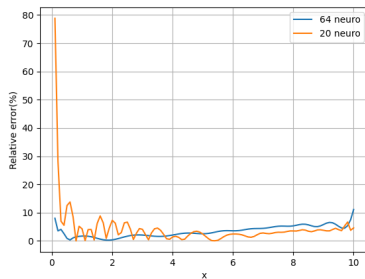
Result

Figure 1: f(x) vs x

Figure 2: Relative error

```python
from tensorflow.keras.layers import Dense
from tensorflow.keras.models import Sequential
import numpy as np

target_fun = lambda x: x*x

model = Sequential([
    Dense(units=20, activation="sigmoid", input_dim = 1),
    Dense(units=20, activation="sigmoid"),
    Dense(units=1)
])

model.compile(optimizer='sgd', loss='mse')

for i in range(2):
    x = np.random.rand(1000000, 1)*10
    y = target_fun(x)

    model.fit(x, y, batch_size=1000, epochs=50)

y_hat = model.predict(x)
error = np.average(np.abs(y-y_hat))

print(np.abs(y-y_hat))
print(error)
print(model.predict(np.ones((1,1))))

model.save("sigmoid_20_twice")
```