

Linear Regression Exercise

November 26, 2025

```
[1]: %%time
%matplotlib inline

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt

from linreg import LinearModel
```

CPU times: user 822 ms, sys: 336 ms, total: 1.16 s
Wall time: 1.11 s

```
[2]: #Explicitly specified the xlrd engine
df = pd.read_excel('chirps.xls', engine='xlrd')
df.head()
```

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```
[2]:      X          Y
0  20.000000  88.599998
1  16.000000  71.599998
2  19.799999  93.300003
3  18.400000  84.300003
4  17.100000  80.599998
```

```
[3]: x = df.X.values
y = df.Y.values
x = np.reshape(x, (x.shape[0], 1))
y = np.reshape(y, (y.shape[0], 1))
```

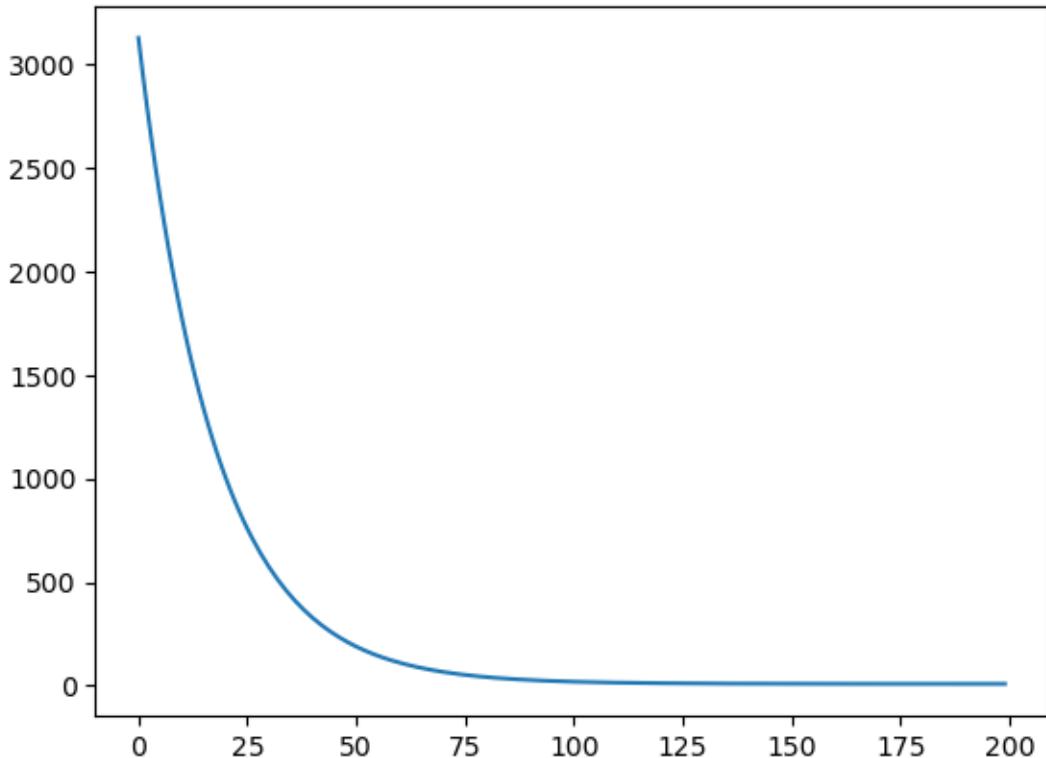
```
[4]: model = LinearModel(1)

losses = model.train(
    x, y,
    200, 0.0001
)
```

Iter: 0, Current loss: 3125.9855

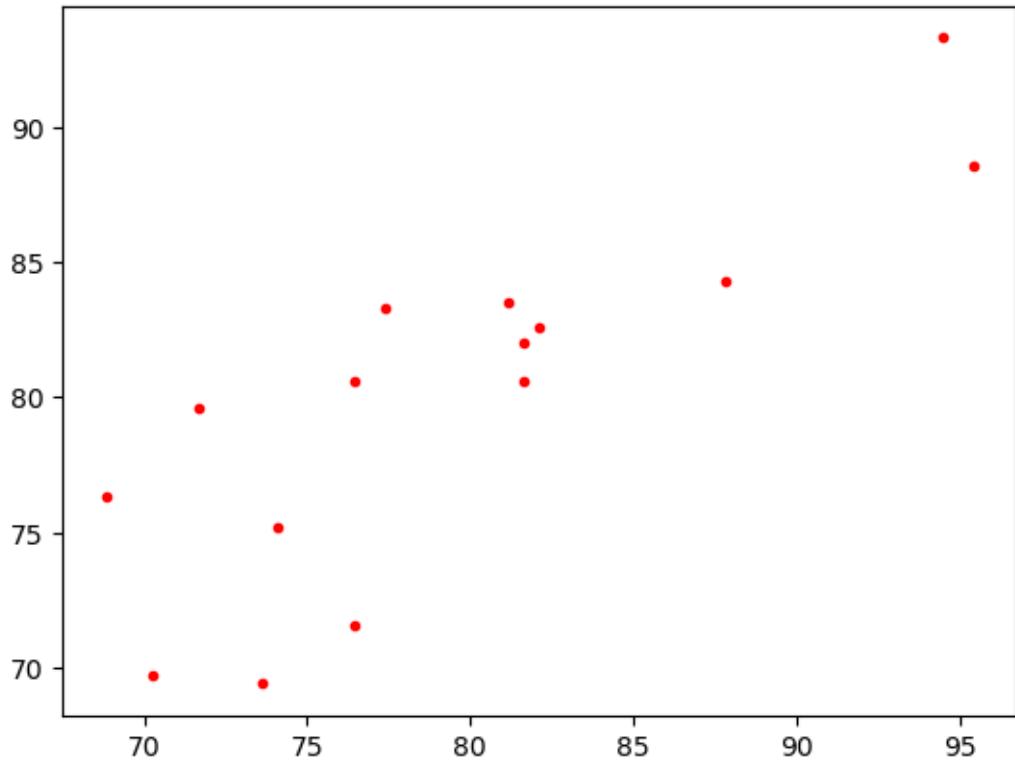
```
Iter: 20, Current loss: 1005.8764
Iter: 40, Current loss: 327.9664
Iter: 60, Current loss: 111.2030
Iter: 80, Current loss: 41.8923
Iter: 100, Current loss: 19.7300
Iter: 120, Current loss: 12.6435
Iter: 140, Current loss: 10.3774
Iter: 160, Current loss: 9.6528
Iter: 180, Current loss: 9.4210
```

```
[5]: plt.plot(losses);
```



```
[6]: y_preds = model.forward_pass(x)
```

```
[7]: plt.plot(y_preds, y, 'r.');
```



```
[8]: print(model.W, model.b)
```

```
[[4.74807109]] 0.4679093344323958
```

$$0.0.1 \quad y = (4.748 * x) + 0.468$$

- This is the relationship that exists between **x** (Number of chirps in a minute) and **y** (Ambient temperature of the room), based on the 15 examples in the given dataset.