

# Linear Regression Exercise

November 27, 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()
```

\*\*\* No CODEPAGE record, no encoding\_override: will use 'iso-8859-1'

```
[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))
```

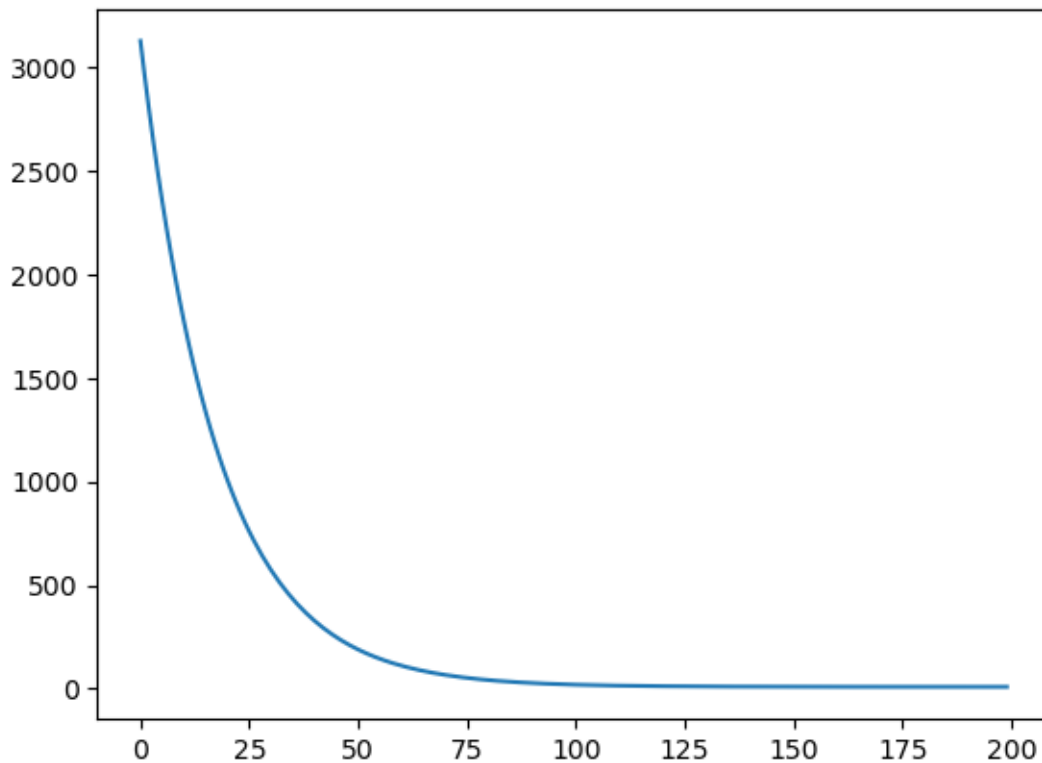
```
[4]: model = LinearModel(1)

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

Iter: 0, Current loss: 3125.9855

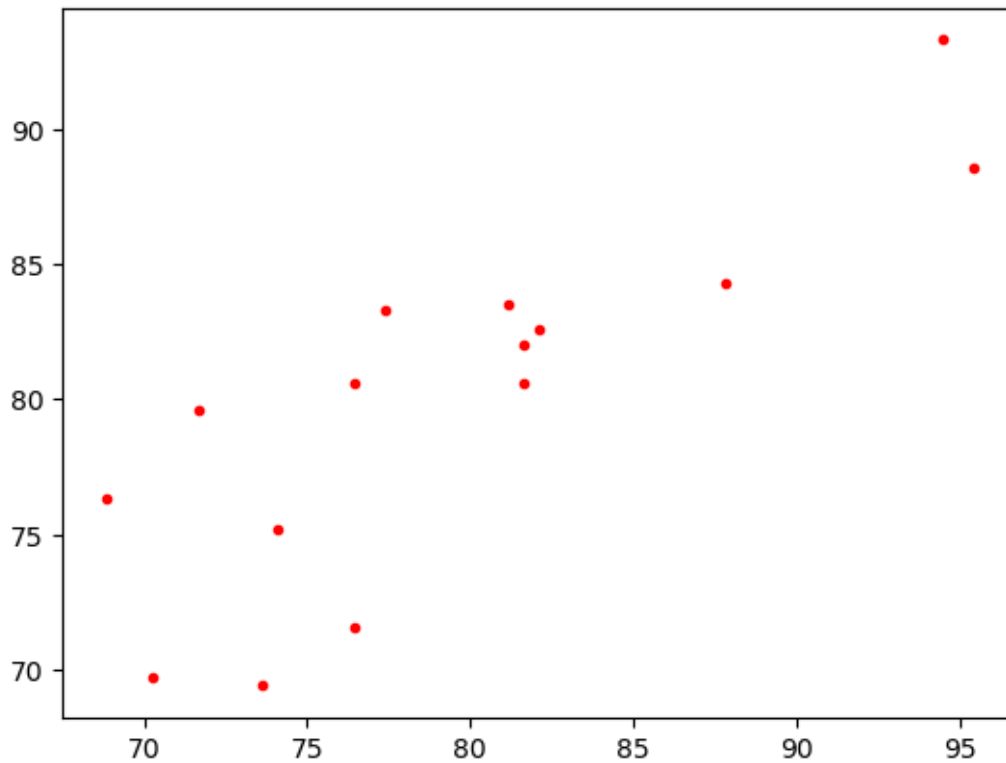
```
Iter: 20, Current loss: 1005.8764
Iter: 40, Current loss: 327.9664
Iter: 60, Current loss: 111.2030
Iter: 80, Current loss: 41.8923
Iter: 100, Current loss: 19.7300
Iter: 120, Current loss: 12.6435
Iter: 140, Current loss: 10.3774
Iter: 160, Current loss: 9.6528
Iter: 180, Current loss: 9.4210
```

```
[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
```

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- $y = (4.748 * x) + 0.468$

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.