

Homework 1 - Machine Learning

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1 Linear Regression with Gnuplot

The list of 13 points in the next page was generate by

```
# y=F([1:0.4:6]) + 0.05*randn(size([1:0.4:6]))
```

1.1 Curve fitting

Using gnuplot, or any other program that automatically solves linear regression,

- plot the points and their linear interpolation
- plot the points and the polynomial of degree 2 that best fits the points
- repeat step above for polynomials of degree 3, 4, 5, 6, 7 and 12
- plot the points and the curve $a \sin(x) + b$ that best fits the points
- choose a family of functions that you feel that might fit well the points. Plot the points and the element of such family that best fits the points

Now repeat the steps above, but using equation (3.15) in the textbook (discussed in lecture). Send me the source code of your program, and the output.

1.2 Regression

For each of the items above, estimate the value of the curve at $x = 2$ and $x = 4$.

x	y
1.0000	0.0588
1.4000	0.0261
1.8000	0.1157
2.2000	0.1694
2.6000	0.1072
3.0000	0.1406
3.4000	0.0334
3.8000	0.0657
4.2000	-0.0766
4.6000	-0.1410
5.0000	-0.1083
5.4000	-0.0394
5.8000	-0.1432