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Figure 1: Parsing Time versus Sentence Length

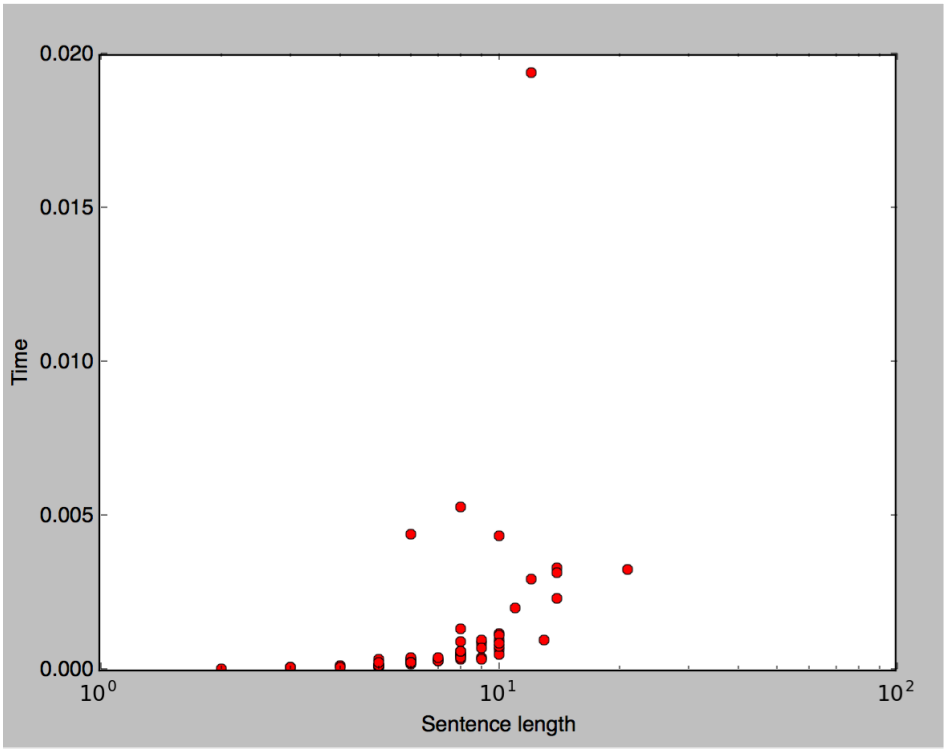

Figure 2: Fitting Results with Linear/Square/Cubic/Quartic Functions

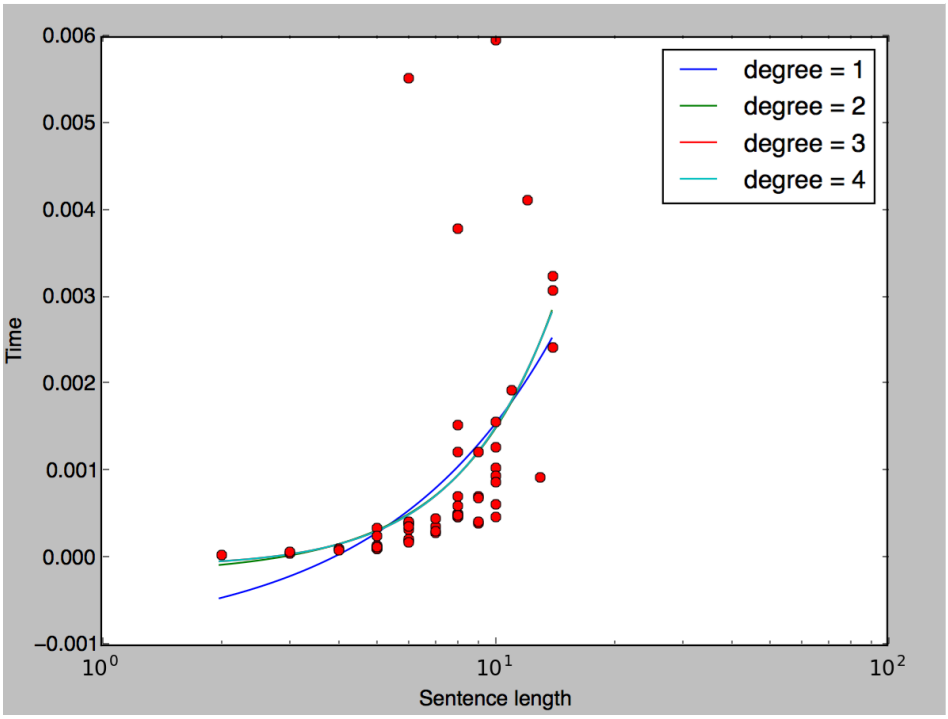

Table 1: Square Loss (Residual) on Fitting with Linear/Square/Cubic/Quartic Functions

Degree	Residual value
d = 1	6.81553108848e-05
d = 2	6.73061004615e-05
d = 3	6.72995842745e-05
d = 4	6.71995606939e-05

The Figure 2 and the Table 1 show that the square function (k=2), the cubic (k=3) and the quartic function (k=4) almost have the same performance on fitting the data. So, from this experiment I can't say that k is close to 3. I think the reason is that the sentence lengths of the samples are relative small, and the time consuming inside a cell, that is the time of searching a rule from the grammar, can't be ignored in such cases.

However, we can calculate a k by picking two points from the set. For example, if the two points are (5, 0.000116) and (8, 0.000601), then k = 3.49

```
In[8]: math.log(6.01/1.16)/math.log(8.0/5.0)
Out[8]:
3.4999830662345217

In[9]:
```