Curve Fitting

May 24, 2021

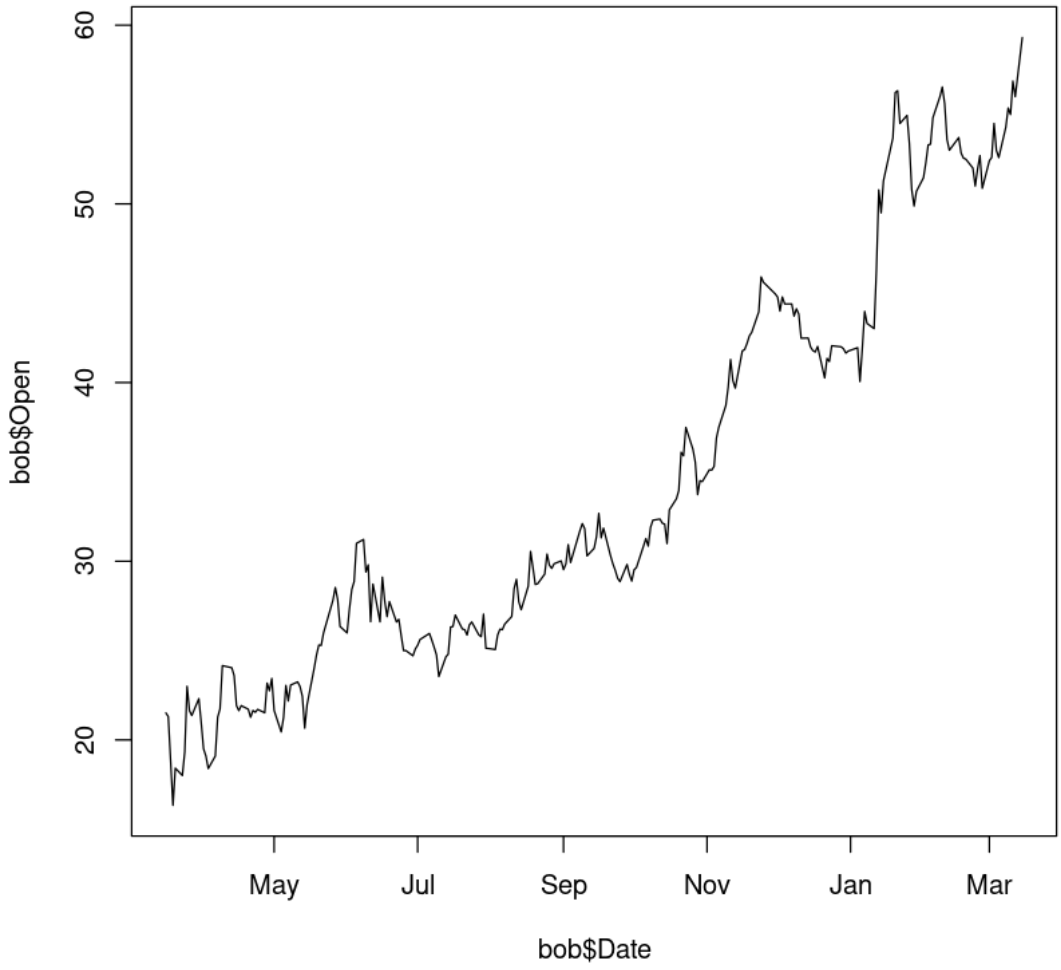
[59]:
```
#The example plotted the low stock prices for GM.
#Make a 3rd order polynominal curve fit for each of the open, close, and low␣
 ↪price.
#Plot the 3 curves, and the original data. Hint, you can use lines to add␣
 ↪additional lines to a plot.
#You can use points to add points to a plot.
#Submit on canvas.
bob <- read.csv("GM.csv")
```

[60]:
```
head(bob,4)
```

A data.frame: 4 × 7

	Date <chr>	Open <dbl>	High <dbl>	Low <dbl>	Close <dbl>	Adj.Close <dbl>	Volume <int>
1	2020-03-16	21.51	22.41	21.00	21.00	21.00	18056800
2	2020-03-17	21.31	21.58	19.50	20.32	20.32	23544400
3	2020-03-18	18.83	19.05	14.33	16.80	16.80	39591100
4	2020-03-19	16.34	18.99	15.00	17.71	17.71	34361800

[89]:
```
bob$Date <- as.Date(bob$Date)

plot(bob$Date,bob$Open,type="l")
```



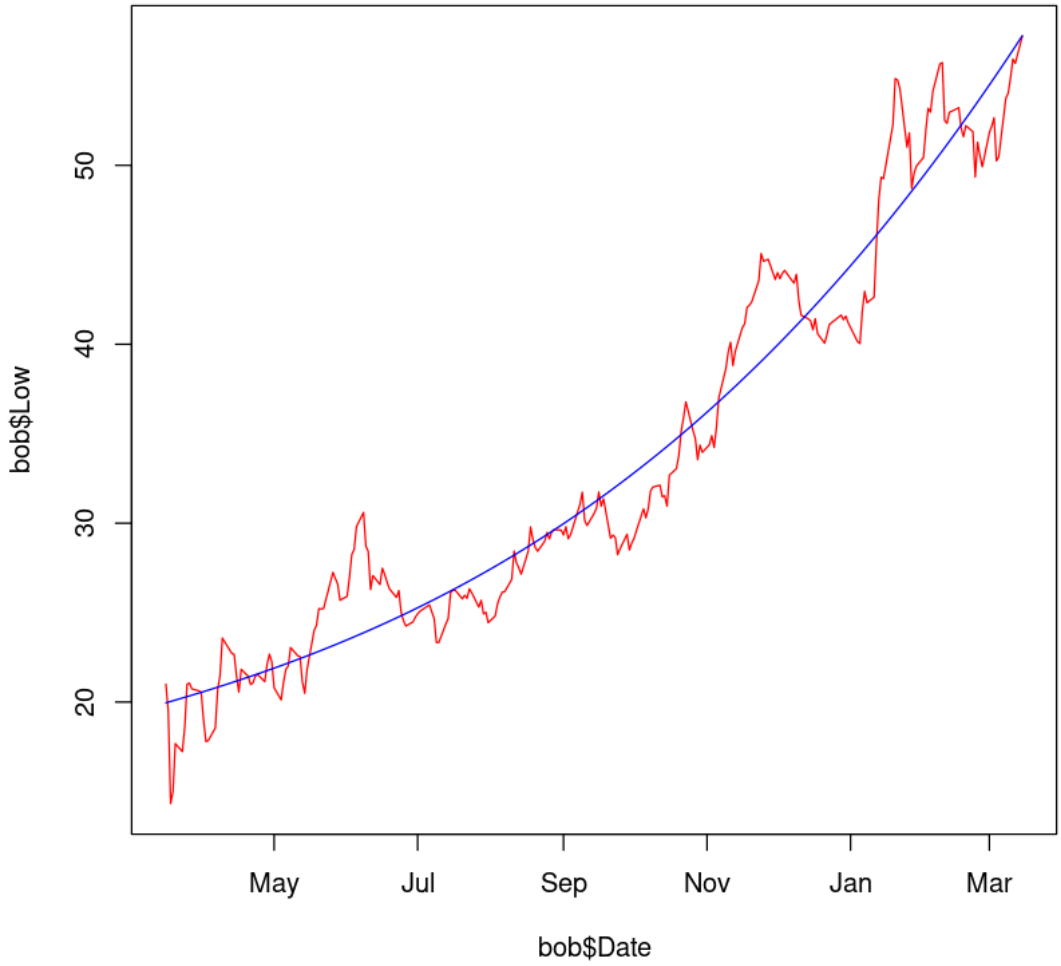
[90]:
```
model_straight <- lm( Low ~ poly(Date,3) ,bob )
```

[91]:
```
summary(model_straight)
```

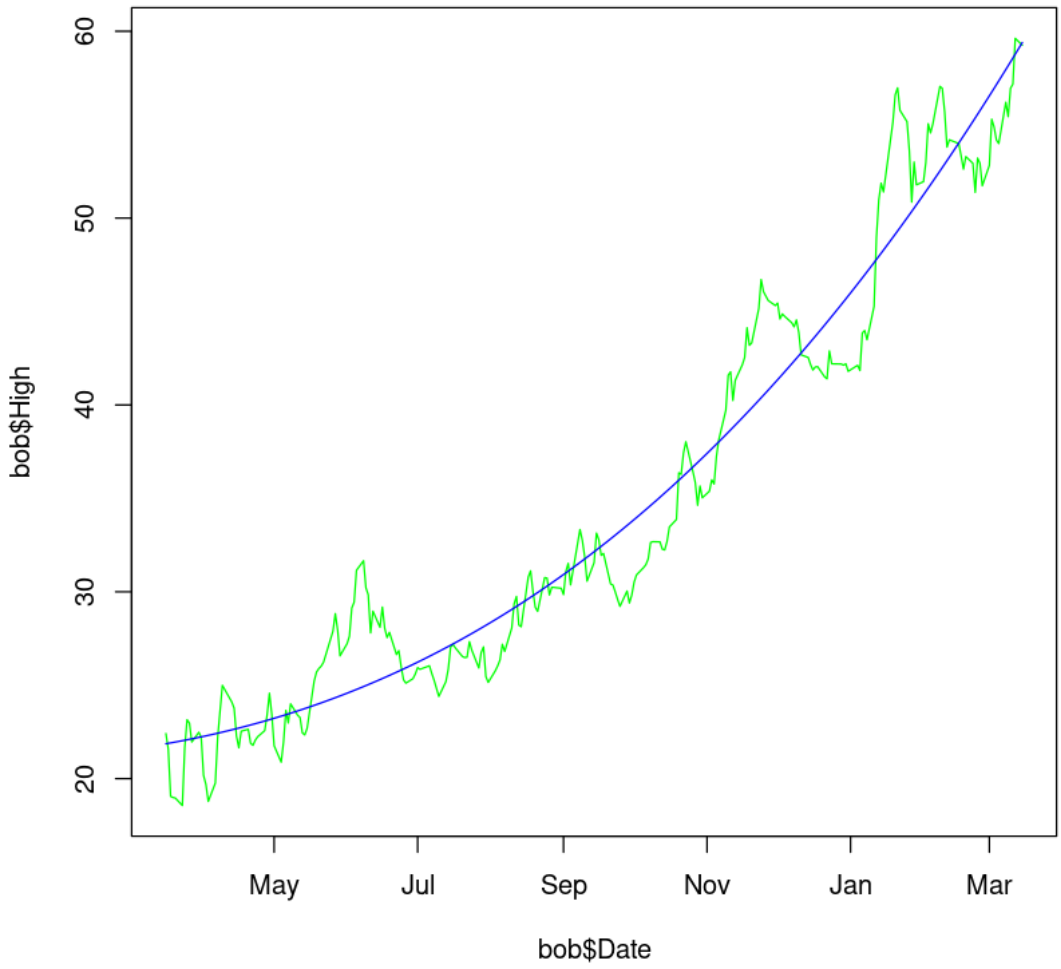
```
Call:
lm(formula = Low ~ poly(Date, 3), data = bob)

Residuals:
    Min      1Q  Median      3Q     Max
-5.7050 -1.7775 -0.3305  1.5095  7.4574

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
```

```
(Intercept)     33.4795     0.1598 209.551   <2e-16 ***
poly(Date, 3)1 164.9001     2.5362  65.018   <2e-16 ***
poly(Date, 3)2  35.6570     2.5362  14.059   <2e-16 ***
poly(Date, 3)3   3.8097     2.5362   1.502    0.134
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2.536 on 248 degrees of freedom
Multiple R-squared:  0.947,Adjusted R-squared:  0.9463
F-statistic:  1476 on 3 and 248 DF,  p-value: < 2.2e-16
```

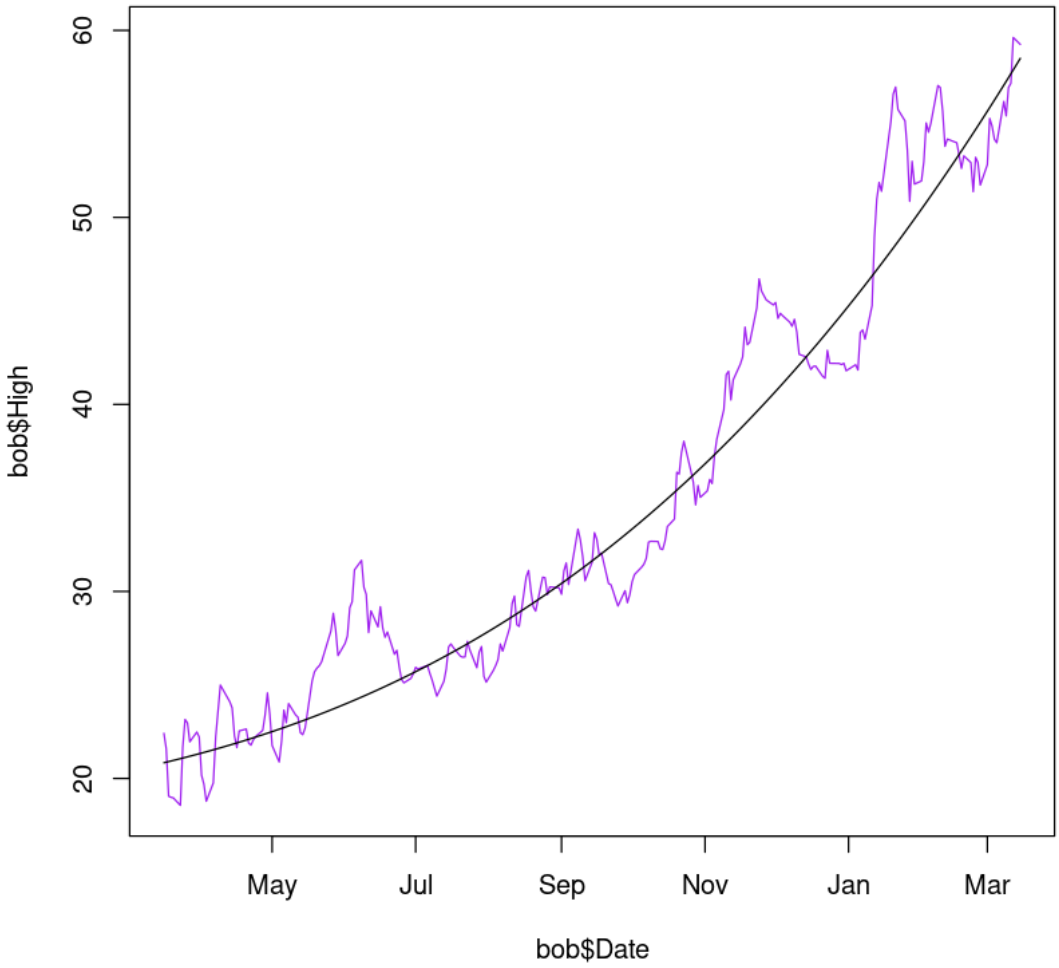
[92]:
```
plot(bob$Date,bob$Low,col="Red",type="l")
lines(bob$Date,fitted(model_straight),col="Blue",type="l")
```



[94]:
```
model_up <- lm( High ~ poly(Date,3) ,bob )
plot(bob$Date,bob$High,col="green",type="l")
lines(bob$Date,fitted(model_up),col="Blue",type="l")
```



[95]:
```
model_close <- lm( Close ~ poly(Date,3) ,bob )
plot(bob$Date,bob$High,col="purple",type="l")
lines(bob$Date,fitted(model_close),col="black",type="l")
```


bob$High
60
50
40
30
20
May
Jul
Sep
Nov
Jan
Mar
bob$Date

[ ]: