

BA4318 Fall 2018 Midterm Exam 2 19.12.2018

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US Crude Oil prices (WTI not Brent) have been decreasing for a while. The reason is that US oil industry has been increasing supply slowly at high prices to be able to finance exploration costs. United States has become the world's largest crude-oil producer.

However, it is hard to estimate when the price fall will stop. More recently, it has been around \$50 per barrel.

- There are also some political events, which changes the trend temporarily. We could see these as random shocks to the planned system of production and pricing. They function similar to natural disasters, create some perception on the shortage of oil and increase the price for a while.
- There is a traditional seasonality due to US domestic demand increasing in summers (i.e. summer driving). However, the demand growth is slower than the supply growth so the effect of this seasonality may be not as visible as before.
- There have been some trends such as strong USD forcing the price of oil to drop in terms of USD. In addition to that, global demand is growing slower than expected just as domestic demand is.
- Analysts estimate that Western Texas wells could still be profitable at \$30 per barrel. This is lower than the lowest price in the past ten years, which is around \$35.

Given ten years of daily data, try to estimate the value of US Crude Oil by the end of this year.

- The data set is in the file "West Texas Intermediate Crude Oil Prices 10 Years.CSV". File has numbers formatted in US format. Also please check the file to see the separator character (it's not a tab).
- The data set is for the past 10 years, **2533 data points**. You need to create an estimate for the next **4 points** (December 18th, 19th, 20th, and 21st).

For the data set check: <https://bit.ly/2BuqCls>

Hints:

1. Use a larger part of this data set as a training data set and the remaining as a test data set. Then use at least two different methods to compare the error terms. Select the method that has the least error term. Note that **you may need to run some methods multiple times to find the best parameters** (i.e. alphas betas)
2. When you select the best method and its parameters, use the whole data set as training data and estimate just 3 points. Print the last item on screen as your output.
3. Now that you are estimating multiple values, it will be easier to develop a function that pushes the estimates to a list (i.e. using append, or using a slice) and returns it.
4. A separate function to calculate error term for estimates could be re-used several times.

SUBMISSION

Prepare your program as a single Python file. Add your name and student ID number as a comment inside the file.

Submit your file by uploading it into ODTUCLASS.

GRADING

80 points for your code.

20 points for your **actual success in estimating December 21st WTI price.** 20 points if you estimate within %3, 15 points for %10, 10 points for %20, 5 points for %30, 2 points for %40 and none for more than %40.