

Homework 4

I. Download the dataset `GAS_Future_2021_Oct15.csv` from the course website, which contains the gas future prices on Oct 15, 2021. Conduct the following analysis parallel to what we did in class for gas future in Lect 9 and 10.

1. Perform polynomial LS regression with degree = 3, 6, 9, and 12 on the future prices. Plot the scatterplot of future prices and superimpose the curves of fitted models.(cf. Lecture 9 P.9)
2. Determine the degree p via ANOVA and R^2 . Justify your choice.(cf. Lecture 9 P.10-11)
3. Use the selected model to predict the next 6 future prices and comment.(cf. Lecture 9 P.12)
4. Fit natural splines with $df = 5, 8, 15$ on the future prices. Plot the scatterplot of future prices and superimpose the curves of fitted models. (cf. Lecture 10 P.15)
5. Compare the fit of polynomial regression with degree = 9 and natural splines with $df = 8$ in terms of both fit and forecast. (cf. Lecture 10 P.16-17)