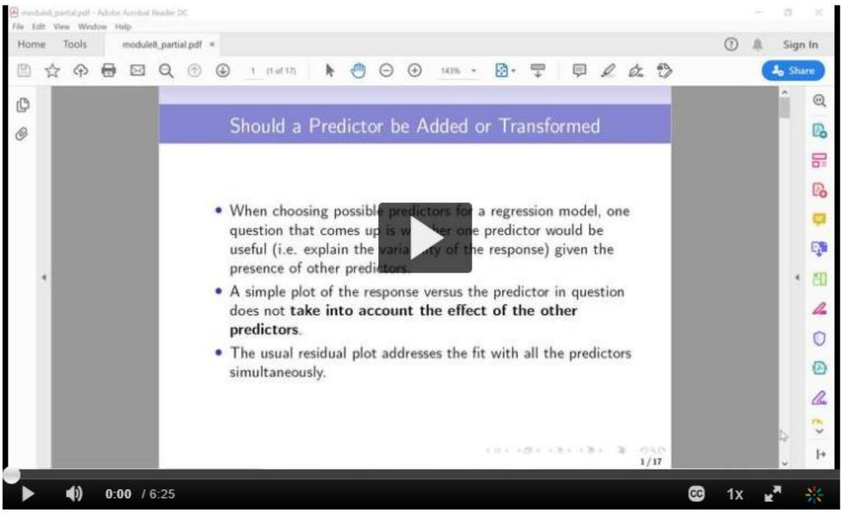
Topic 8.2: Residual Analysis

Read Sections 4.1 to 4.2.4, and 4.3 of your textbook. As you read, take notes on the following.

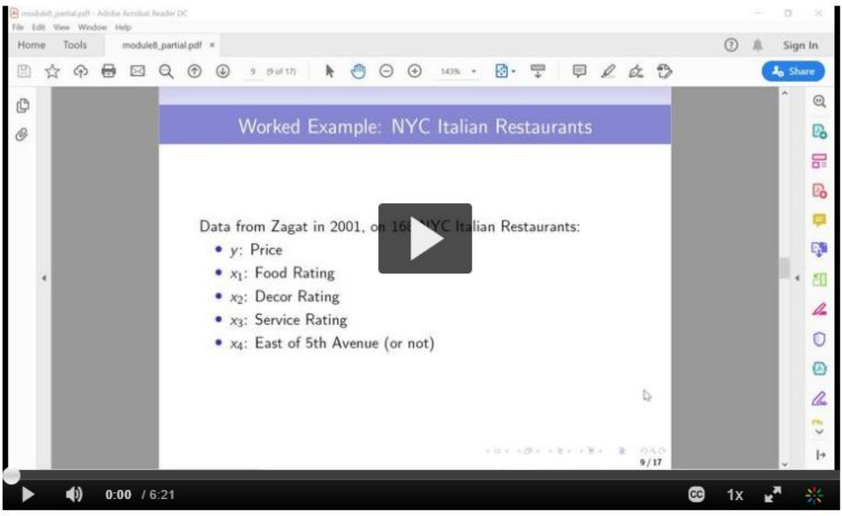
1. Consider residuals, $e_i = y_i - \hat{y}_i$. What are the properties (mean, variance, etc.) associated with residuals?
2. Why do data points that are outlying in terms of the predictors have small residuals?
3. Write down the formula for standardized residuals, d_i. What are the properties associated with standardized residuals and how are these properties similar or different with residuals?
4. Write down the formula for studentized residuals, r_i. What are the properties associated with studentized residuals and how are these properties similar or different with residuals?
5. Write down the two formulas for PRESS residuals, $e_{(i)}$. Why are PRESS residuals useful in detecting outliers in the predictors?
6. Write down the formula for externally studentized residuals, t_i. What distribution does t_i follow? How do we use t_i to detect outliers?
7. How do we use a partial regression plot to investigate the marginal role of a predictor given the other predictors in a regression model?
8. Write down the two formulas for the PRESS statistic. What is the PRESS statistic used for?

Watch the two videos below to see how to produce a partial regression plot and how to use it with a worked data example. The corresponding slides can be downloaded below the videos.

Part 1



Part 2



module8_partial.pdf
Slides to accompany the "Partial Regression Plot" videos