Classwork 8: Heteroskedasticity (analytical)

EC421

2022-10-23

Goldfeld-Quandt and White tests

1) Goldfeld-Quandt Test

1a) In your own words, explain the intuition of how the Goldfeld-Quandt test works.

1b) Suppose you're running the Goldfeld-Quandt test and the SSR from the regression using small X is 12 and the SSR from the regression with large X is 36. If the total number of observations in the dataset is n = 50 and the number of explanatory variables k = 2, will the Goldfeld-Quandt test detect heteroskedasticity at the 99.9% percent level? (Hint: use the `rf` family)

2) White Test

2a) In your own words, explain the intuition of how the White test works.

2b) Suppose the R^2 from the e^2 ~ x + x^2 (k = 2) regression is 0.2. If there are n = 50 observations, will the White test detect heteroskedasticity at the 99.9% level (hint: use the `rchisq` family)?

3) Comparing the two tests

3a) If the variance of u_i is increasing with x_i, which tests will detect heteroskedasticity?

3b) If the variance of u_i is decreasing with x_i, which tests will detect heteroskedasticity?

3c) If the variance of u_i is *increasing and then decreasing* with x_i, which tests will detect heteroskedasticity?

3d) If there are outliers, which tests will detect heteroskedasticity?