

Questions that will appear on the final exam. The final exam will contain the following questions, and if you can answer these questions reasonably well, you are guaranteed to pass the course. There will be two more questions on the exam that will be surprises.

1. Regarding collinearity
 - (a) What is collinearity?
 - (b) What effects does it have on the OLS estimator and on hypothesis tests based on the OLS estimator?
 - (c) How can the presence of collinearity be detected?
 - (d) Write an example of an econometric model that exhibits perfect (exact) collinearity.
2. In the context of the OLS estimator with possible heteroscedasticity and/or autocorrelation, explain what are robust covariance estimators, and why one might prefer to use a robust covariance estimator instead of the formulae that apply under the classical assumptions.
3. Explain the steps needed to compute White's test for the presence of heteroscedasticity, and how to determine whether or not to reject the null hypothesis of homoscedasticity using the test.
4. The exponential density is

$$f_X(x) = \begin{cases} \lambda e^{-\lambda x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

Suppose we have an independently and identically distributed sample of size n , $\{x_i\}$, $i = 1, 2, \dots, n$, where each x_i follows this exponential distribution.

- (a) write the log likelihood function
- (b) compute the maximum likelihood estimator of the parameter λ .