

Econometrics Test

2015 - 09 - 24

Name: _____

Matricola: _____ email: _____

1. Say if the following statements are unambiguously true (TRUE), unambiguously false (FALSE) or impossible to classify the way they are stated (CAN'T SAY). Write the motivations to your answers **only** in the space provided. A "CAN'T SAY" answer with no motivations will be considered wrong.

- (a) If \mathbf{x} is a non-zero vector with more than one element, then the matrix $\mathbf{x} \cdot \mathbf{x}'$ is singular.

TRUE ☐ FALSE ☐ CAN'T SAY ☐

- (b) If \mathbf{x} is a non-zero vector with more than one element, then the matrix $\mathbf{x}'\mathbf{x}$ is singular.

TRUE ☐ FALSE ☐ CAN'T SAY ☐

- (c) If $X_n \xrightarrow{d} N(0, 1)$, then the probability of $|X_n|$ being large tends to 0 as n gets large.

TRUE ☐ FALSE ☐ CAN'T SAY ☐

- (d) In the linear model $y_i = \beta_0 + \beta_1 x_i + u_i$, the condition that $V(u_i|x_i)$ is constant is fundamental for the efficiency of the OLS estimator.

TRUE ☐ FALSE ☐ CAN'T SAY ☐

- (e) In a dynamic model, the long-run elasticity is always larger (in absolute value) than the short-run elasticity.

TRUE ☐ FALSE ☐ CAN'T SAY ☐

3. Consider the following dynamic model:

$$y_t = 0.75y_{t-1} - 0.5y_{t-2} + x_t - x_{t-1} + 0.5x_{t-2}$$

(a) Calculate the dynamic multipliers up to the fourth order;

$$\delta_0 = \text{_____} \quad \delta_1 = \text{_____} \quad \delta_2 = \text{_____} \quad \delta_3 = \text{_____} \quad \delta_4 = \text{_____}$$

(b) Calculate the cumulated multipliers up to the fourth order;

$$c_0 = \text{_____} \quad c_1 = \text{_____} \quad c_2 = \text{_____} \quad c_3 = \text{_____} \quad c_4 = \text{_____}$$

(c) Calculate $c = \lim_{n \rightarrow \infty} c_n = \sum_{i=0}^{\infty} \delta_i = \text{_____}$.