LaTeX for Economists – Mini exam

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Abstract

This is the mini exam for the LaTeX for Economists course at CEU.

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1   Topics[1]

(a) Text styling

    (i) Bold, emphasize

    (ii) Alignment, spacing

(b) Math

(c) Graphics

If stuck, refer to Google.

2   Math

Problem 1 (Wooldridge Problem 9.7 (i)). *(This problem is taken from Wooldridge (2009).)*

Consider the simple regression model with classical measurement error, $y = \beta_0 + \beta_1 x^* + u$, where we have m measures on x^*. Write these as $z_h = x^* + e_h, h = 1, \ldots, m$. Assume that x^* is uncorrelated with $u, e_1, \ldots, e_m$, that the measurement errors are pairwise uncorrelated, and have the same variance, σ_e^2. Let $w = (z_1 + \ldots + z_m)/m$ be the average of the measures on x^*, so that, for each observation i, $w_i = (z_{i1} + \ldots + z_{im})/m$ is the average of the m measures. Let $\bar{\beta}_1$ be

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[1] A footnote in headings is not straightforward.

the OLS estimator from the simple regression y_i on $1, w_i, i = 1, \ldots, n$, using a random sample of data. Show that

$$\operatorname*{plim}_{n \to \infty}(\bar{\beta}_1) = \beta_1 \cdot \left\{ \frac{\sigma_{x^*}^2}{\sigma_{x^*}^2 + \frac{\sigma_e^2}{m}} \right\}. \tag{1}$$

The meaning of matrix X can be found in Table 1.

Notation	Meaning
X	$\begin{pmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{pmatrix}$
An $m \times n$ matrix	

Table 1: What does X mean?

3 Graphics

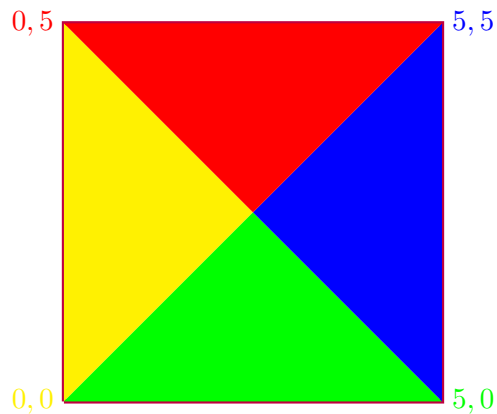This section include figures 1 and 2. Figure 2 consists of figures 2a and 2b.

Figure 1: A colorful square.
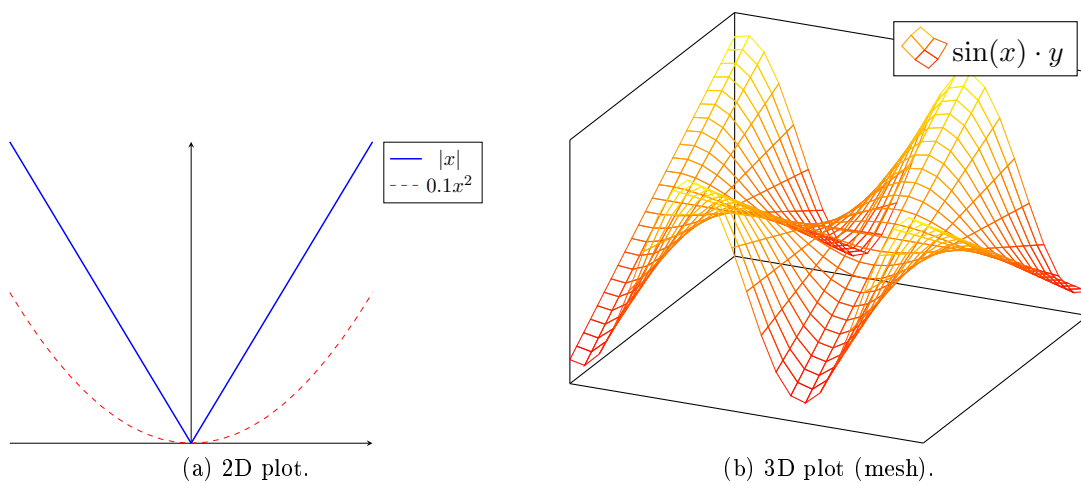

(a) 2D plot.

(b) 3D plot (mesh).

Figure 2: 2- and 3-dimensional plots.

References

Wooldridge, J. M. (2009). *Introductory Econometrics: A Modern Approach*. South-Western Cengage Learning, 4th edition.