

INTRODUCTORY ECONOMETRICS

Exercise 9 : Examination Preparation

1. Use the technique of triangular reduction (Gaussian Elimination) followed by back-substitution to solve the following matrix equations:

$$\begin{bmatrix} 2 & 2 & 2 \\ 6 & 5 & 4 \\ 2 & 2 & 4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}, \quad (\text{i})$$

$$\begin{bmatrix} 18 & -3 & -2 \\ -6 & 15 & -4 \\ -2 & -2 & 16 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 10 \\ 20 \\ 10 \end{bmatrix}. \quad (\text{ii})$$

An example of the technique is provided by the sequence of equations (34)—(38) from Lecture 2.

2. Calculate the first five terms of the impulse response of the transfer function from $x(t)$ to $y(t)$ when

$$(1 - \phi_1 L - \phi_2 L^2)y(t) = (\beta_0 + \beta_1 L)x(t)$$

- (i) In the case where $\phi_1 = 0.5$, $\phi_2 = 0$, $\beta_0 = 0.5$ and $\beta_1 = 0.25$,
- (ii) In the case where $\phi_1 = 1/2$, $\phi_2 = 1/4$, $\beta_0 = 2$ and $\beta_1 = 0$.