2017 Fall EE203001 Linear Algebra - Quiz 2(solution)

Name: ID:

1. Consider the system:

$$x + 2y + \ z = 3$$
$$2x + 4y + 3z = 7$$
$$y + \ z = 5$$

   (a) Write down the corresbonding augmented matrix.
   (b) Find E_{21} and then P_{32} to reach a triangular system. What matrix E will do both steps at once?

Ans:

1. (a)

$$\text{Augmented matrix} = \begin{pmatrix} 1 & 2 & 1 & \mathbf{3} \\ 2 & 4 & 3 & \mathbf{7} \\ 0 & 1 & 1 & \mathbf{5} \end{pmatrix}$$

   (b) By definition:

$$E_{21} = \begin{pmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$P_{32} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

   The combined matrix(beware of the multiplying order) is:

$$E = P_{32}E_{21} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ -2 & 1 & 0 \end{pmatrix}$$