2018 Fall EECS205002 Linear Algebra

Name: ID:

2018/12/05 Quiz 6

1. Explain the following terms about linear transformation.
   - Linear transformation:
   - Onto:
   - Similarity:

2. Find the point on the line $y = 2x + 1$ that is closest to the point $(5, 2)$.

3. Let $E = \{\vec{u}_1, \vec{u}_2, \vec{u}_3\}$ be an ordered basis for $\mathbb{R}^3$ and $F = \{\vec{b}_1, \vec{b}_2\}$ be an ordered basis for $\mathbb{R}^2$, where

$$\vec{u}_1 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}, \vec{u}_2 = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}, \vec{u}_3 = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}, \vec{b}_1 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}, \vec{b}_2 = \begin{bmatrix} 2 \\ -1 \end{bmatrix}.$$

A linear transformation L maps Find the matrix representation of $L((x_1, x_2, x_3)^T) = (2x_2, -x_1)^T$ with respect to ordered bases E and F.