MATLAB TEST 2016 Solutions

1(a) $(0, 0, -12, 2, 43, 43, 41, 43)$

(b) $-1/22,977$

(c) $-\frac{1}{244}(11, 11, 11, 11, 1, 1, 1, 1)$

(d) 2

2(a) 3 (b) $\underset{\sim}{r}_4 = -0.065\,\underset{\sim}{r}_3 + 1.3125\,\underset{\sim}{r}_2 + 1.8125\,\underset{\sim}{r}_1$

(c) 2nd & 4th (d) $\underset{\sim}{v}_2$ & $\underset{\sim}{v}_4$

(e) $\underset{\sim}{v}_2 = \underset{\sim}{a}_1 - \underset{\sim}{a}_3 + \frac{2}{3}\underset{\sim}{a}_6$

3(a) $T\underset{\sim}{i} = \begin{bmatrix} 3 \\ 0 \\ 0 \end{bmatrix}$ $T\underset{\sim}{j} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$ $T\underset{\sim}{k} = \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$

(b) (C) (c) $A_T^{-1} = \begin{bmatrix} 1/3 & 0 & 0 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{bmatrix}$

(d) (A)

4(a) $P_{S,B} = \begin{bmatrix} -1 & 1/2 & 1/2 & 1/2 & 1/2 \\ 1/2 & -1/2 & 0 & 0 & 0 \\ 1/2 & 0 & -1/2 & 0 & 0 \\ 1/2 & 0 & 0 & -1/2 & 0 \\ 1/2 & 0 & 0 & 0 & -1/2 \end{bmatrix}$

$P_{B,S} = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & -1 & 1 & 1 & 1 \\ 1 & 1 & -1 & 1 & 1 \\ 1 & 1 & 1 & -1 & 1 \\ 1 & 1 & 1 & 1 & -1 \end{bmatrix}$

(b) $[\underset{\sim}{v}_1]_B = \begin{bmatrix} 17 \\ 13 \\ 11 \\ 9 \\ -1 \end{bmatrix}$ $[\underset{\sim}{v}_2]_B = \begin{bmatrix} 6 \\ 10 \\ 2 \\ 2 \\ 2 \end{bmatrix}$ $[\underset{\sim}{v}_3]_B = \begin{bmatrix} 2 \\ 0 \\ 2 \\ 0 \\ 2 \end{bmatrix}$

(c) $A_T = \begin{bmatrix} 0 & -1 & -1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 1/2 & 1/2 & 1/2 & 1/2 & 1/2 \\ 1/2 & 1/2 & 1/2 & 1/2 & 1/2 \end{bmatrix}$ (d) $[T]_{BB} = \text{diag}(1, 1, 1, 0, 0)$

$T^{99}\underset{\sim}{b}_2 = \underset{\sim}{b}_2$