MAST10007 Matlab Test Answers 2014

Q1 (a) $\{(1,0,1,3,1), (-1,1,-2,4,0), (-6,11,11,3,1)\}$

(b) $(-2,3,-5,15,1) = (1,0,1,3,1) + 3(-1,1,-2,4,0)$

(c) $\{(-\frac{1}{2}, \frac{1}{2}, 0, -\frac{1}{2}, 1), (-1,-3,1,0,0)\}$

(d) 2nd & 3rd vectors

Q2 (a) $\begin{bmatrix} 4 & 9 & 35 \\ 9 & 35 & 153 \\ 35 & 153 & 707 \end{bmatrix}$

(b) $\begin{bmatrix} 8.4 \\ 30.1 \\ 35.3 \end{bmatrix}$

(c) $y = 0.9090 - 0.2519x + 0.2009x^2$

(d) $y \simeq 3.1$

Q3 (a) 496

(b) -840

(c) $\frac{1}{\sqrt{6}}(0,1,0,0,0,1,1,1,1,1)$

$\frac{1}{\sqrt{6}}(0,0,1,0,0,1,1,1,1,1)$

(d) $\underline{8.0}\,(0,1,1,0,0,2,2,2,2,2)$

Q4 (a) $\begin{bmatrix} -2 \\ 2 \\ 1 \\ -1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

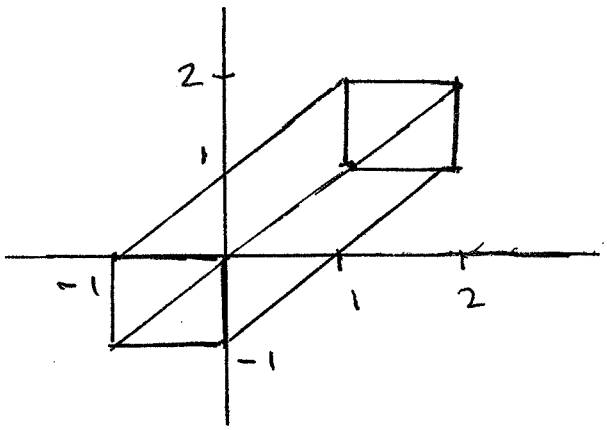
(c) $\begin{bmatrix} 2 & 2 & 2 & 2 \\ 1 & 3 & 3 & 3 \\ 0 & 1 & 3 & 3 \\ 0 & 0 & 1 & 0 \end{bmatrix}$

(d) $\underset{\sim}{c}_1 = (2,1,0,0)$ $\quad \underset{\sim}{c}_2 = (2,3,1,0)$

$\underset{\sim}{c}_3 = (2,3,3,1)$ $\quad \underset{\sim}{c}_4 = (2,3,3,0)$

5 (a) $T\underset{\sim}{i} = \begin{bmatrix} -1 \\ 0 \end{bmatrix}$ $\quad T\underset{\sim}{j} = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$ $\quad T\underset{\sim}{k} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$

5 (b)



(c) $[T]_{S,B} = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \end{bmatrix}$

(d) $\ker T = \text{Span}\{(2,2,1)\}$

Alternative Q2

(a) $\begin{bmatrix} 5 & 15 \\ 15 & 71 \end{bmatrix}$ $\quad$ (b) $\begin{bmatrix} 14.3 \\ 65.5 \end{bmatrix}$ $\quad$ (c) $y = 0.2523 + 0.8692x$

(d) $y \approx 3.7$