

Homework #1 -- due Friday, 16 January 2009 *** turn in just starred (*) questions ***

Exercises at end of Chapter 1: 1, 3 (linear, but with different parameters)

Exercises at end of Appendix A: 3, 4, 5, 9, 12*, 18*, 19*, 20*, 21*, 22, 69*

*** for Exercises A.18 – 21, use the matrix **A** below ***

$$\mathbf{A} = \begin{bmatrix} 1 & -1 & 3 \\ 1 & -1 & 3 \\ 1 & 2 & -1 \\ 1 & -1 & 3 \\ 1 & 2 & -1 \end{bmatrix}$$

newer questions:

w) Let $\mathbf{B} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ and $\mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}$

i) Write the quadratic form $\mathbf{x}^T \mathbf{B} \mathbf{x}$ in a simple algebraic expression.

ii) Find the rank of **B**.

iii) Is **B** positive definite? Why or why not?

x) Solve the system of equations $\begin{bmatrix} 7 & 4 \\ 4 & 13 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$

y) Find the eigenvalues and eigenvectors of the matrix $\begin{bmatrix} 7 & 4 \\ 4 & 13 \end{bmatrix}$

z) Is this matrix positive definite? $\begin{bmatrix} 7 & 4 \\ 4 & 13 \end{bmatrix}$