Homework Day 2 - ECON 186

Problem 1. Chiang and Wainwright 4.2 #1,2, 4, 6

#1 Given

$A=\begin{bmatrix} 7 & -1 \\ 6 & 9 \end{bmatrix}$, $B=\begin{bmatrix} 0 & 4 \\ 3 & -2 \end{bmatrix}$, $C=\begin{bmatrix} 8 & 3 \\ 6 & 1 \end{bmatrix}$,

find: (a) $A+B$ (b)$C-A$ (c)$3A$ (d)$4B+2C$

#2 Given

$A=\begin{bmatrix} 2 & 8 \\ 3 & 0 \\ 5 & 1 \end{bmatrix}$, $B=\begin{bmatrix} 2 & 0 \\ 3 & 8 \end{bmatrix}$, $C=\begin{bmatrix} 7 & 2 \\ 6 & 3 \end{bmatrix}$:

(a)Is AB defined? Calculate AB. Can you calculate BA? Why?

(b)Is BC defined? Calculate BC. Is CB defined? If so, calculate CB. Is $BC=CB$ true?

#4 Find the product matrices in the following (in each case, append beneath every matrix a dimension indicator):

(a)$\begin{bmatrix} 0 & 2 & 0 \\ 3 & 0 & 4 \\ 2 & 3 & 0 \end{bmatrix}\begin{bmatrix} 8 & 0 \\ 0 & 1 \\ 3 & 5 \end{bmatrix}$, (c)$\begin{bmatrix} 3 & 5 & 0 \\ 4 & 2 & -7 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix}$

(b)$\begin{bmatrix} 6 & 5 & -1 \\ 1 & 0 & 4 \end{bmatrix}\begin{bmatrix} 4 & -1 \\ 5 & 2 \\ 0 & 1 \end{bmatrix}$, (d)$\begin{bmatrix} a & b & c \end{bmatrix}\begin{bmatrix} 7 & 0 \\ 0 & 2 \\ 1 & 4 \end{bmatrix}$

#6 Expand the following summation expressions:

(a)$\sum_{i=2}^{5} x_i$ (b)$\sum_{i=5}^{8} a_i x_i$ (c)$\sum_{i=1}^{4} b x_i$ (d)$\sum_{i=1}^{n} a_i x^{i-1}$ (e)$\sum_{i=0}^{3} (x+i)^2$

Problem 2. Chiang and Wainwright 4.3 #1(a, b, d), 2

#1 Given $u'=\begin{bmatrix} 5 & 1 & 3 \end{bmatrix}$,$v'=\begin{bmatrix} 3 & 1 & -1 \end{bmatrix}$, $w'=\begin{bmatrix} 7 & 5 & 8 \end{bmatrix}$, and $x'=\begin{bmatrix} x_1 & x_2 & x_3 \end{bmatrix}$, write out the column vectors, u,v,w and x, and find

(a)uv' (b)uw' (d)$v'u$

#2 Given

$w=\begin{bmatrix} 3 \\ 2 \\ 16 \end{bmatrix}$, $x=\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$, $y=\begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$, and $z=\begin{bmatrix} z_1 \\ z_2 \end{bmatrix}$:

(a)Which of the following are defined: $w'x$, $x'y', xy', y'y, zz', yw', xy$?

(b)Find all the products that are defined.

Problem 3. Chiang and Wainwright 4.4 #1

#1 Given $A=\begin{bmatrix} 3 & 6 \\ 2 & 4 \end{bmatrix}$, $B=\begin{bmatrix} -1 & 7 \\ 8 & 4 \end{bmatrix}$, and $C=\begin{bmatrix} 3 & 4 \\ 1 & 9 \end{bmatrix}$, verify that

(a)$(A+B)+C=A+(B+C)$ (b)$(A+B)-C=A+(B-C)$

Problem 4. Chiang and Wainwright 4.5 #1

#1 Given $A=\begin{bmatrix} -1 & 5 & 7 \\ 0 & -2 & 4 \end{bmatrix}$, $b=\begin{bmatrix} 9 \\ 6 \\ 0 \end{bmatrix}$, and $x=\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$:

Calculate: (a) AI (b)IA (c)Ix (d)$x'I$

Indicate the dimension of the identity matrix used in each case.

Problem 5. Chiang and Wainwright 4.6 #1, 2

#1

Given $A=\begin{bmatrix} 0 & 4 \\ -1 & 3 \end{bmatrix}$, $B=\begin{bmatrix} 3 & -8 \\ 0 & 1 \end{bmatrix}$, $C=\begin{bmatrix} 1 & 0 & 9 \\ 6 & 1 & 1 \end{bmatrix}$, find A', B', and C'.

#2 Use the matrices given in Prob. 1 to verify that

(a)$(A+B)'=A'+B'$ (b)$(AC)'=C'A'$