SI Session: October 09, 2008
Mondays: 3:00 PM – 4:30 PM
Tuesdays: 1:30 PM – 3:00 PM
Thursdays: 1:30 PM – 3:00 PM
Room 1239 SNAD

Prof. McCurdy : Linear Algebra
Fall 2008
SI Leader : Neil Jody

[1] Compute each matrix sum or product if it is defined. If an expression is undefined, explain why.

Let $A = \begin{bmatrix} 2 & 0 & -1 \\ 4 & -5 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 7 & -5 & 1 \\ 1 & -4 & -3 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$,

$D = \begin{bmatrix} 3 & 5 \\ -1 & 4 \end{bmatrix}$, $E = \begin{bmatrix} -5 \\ 3 \end{bmatrix}$

(a) A+2B

(b) 3C-E

(c) CB

(d) EB

(e) DB

[2] Compute $A-5I_3$ and $(5I_3)A$, when $A=\begin{bmatrix} 9 & -1 & 3 \\ -8 & 7 & -6 \\ -4 & 1 & 8 \end{bmatrix}$.

[3] Compute the product AB in two ways: (a) by the definition, where $A\vec{b}_1$ and $A\vec{b}_2$ are computed separately, and (b) by the row-column rule for computing AB, when $A=\begin{bmatrix} 4 & -2 \\ -3 & 0 \\ 3 & 5 \end{bmatrix}$ and $B=\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$.

[4] Find the inverse of the following matrix without using a calculator:

$$\begin{bmatrix} -1 & 2 & -3 \\ 2 & 1 & 0 \\ 4 & -2 & 5 \end{bmatrix}$$

[5] Find all values of x and y that make the following matrix equation true, or demonstrate that no such x and y exist:

$$\begin{bmatrix} -8 & 4 & x \\ 14 & -7 & 3 \end{bmatrix} \begin{bmatrix} -5 & 3 \\ -12 & 9 \\ y & 7 \end{bmatrix} = \begin{bmatrix} 1 & -2 \\ 2 & 0 \end{bmatrix}$$

[6] Determine if each statement is true or false.

(a) If A and B are invertible matrices, then so is AB .
(b) If A and B are invertible matrices, then so is $A + B$.
(c) If A^2 is an invertible matrix, then so is A.
(d) If A, B, and C are matrices such that $AB = AC$, then $B = C$.
(e) If A and B are matrices such that $AB = O$, then $A = O$ or $B = O$.

[7] Let $\vec{u} = \begin{bmatrix} -2 \\ 3 \\ -4 \end{bmatrix}$ and $\vec{v} = \begin{bmatrix} a \\ b \\ c \end{bmatrix}$. Compute $\vec{u}^T \vec{v}$, $\vec{v}^T \vec{u}$, $\vec{u}\vec{v}$, and $\vec{v}\vec{u}^T$.