

Workshop on Scilab

Funded by the National Mission on Education through ICT

Jointly organized by

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www.bprim.org

4 - 7 July, 2009

Assignment-1

1. In Scilab enter the following Matrices

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

$$B = \begin{bmatrix} 4 * 2 & 2/3 \\ 1/201 & 5 - 8.2 \\ 0.0001 & (9 + 4)/30 \end{bmatrix}$$

Using the Scilab command display the following

(a) a_{23}, b_{32}, b_{12}

(b) $row_1(A), col_3(A), row_2(B)$

2. In Scilab, type the command clear, then enter the following matrices

$$A = \begin{bmatrix} 1 & 1/2 \\ 1/3 & 1/4 \\ 1/5 & 1/6 \end{bmatrix}, B = [5 \quad -2], C = \begin{bmatrix} 4 & 5/4 & 9/4 \\ 1 & 2 & 3 \end{bmatrix}$$

Using Scilab commands, compute each of the following, if possible.
Recall that a prime in Scilab indicates transpose.

(a) $A * C$

(b) $A * B$

(c) $A + C'$

(d) $B * A - C' * A$

(e) $(2 * C - 6 * A') * B'$

(f) $A * C - C * A$

(g) $A * A' + C' * C$

3. Enter the coefficient matrix of the system

$$2x + 4y + 6z = -12$$

$$2x - 3y - 4z = 15$$

$$3x + 4y + 5z = -8$$

into Scilab and call it A. Enter the right-hand side of the system, call it

- b. Form the augmented matrix associated with the linear system using the Scilab command `[A b]`. To give the augmented matrix a name such as `aug`, use the command `aug = [A b]`.
4. Use the Scilab command `diag` to form each of the following diagonal matrices.
- The 4x4 diagonal matrix with main diagonal `[1 2 3 4]`.
 - The 5x5 diagonal matrix with main diagonal `[0 1 1/2 1/3 1/4]`.
 - The 5x5 scalar matrix with all 5's on the diagonal.
5. Let $A = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \end{bmatrix}$
 Use the Scilab Command `size` to get the number of rows and number of columns. Form the identity matrix using the command `eye(m, n)`. Then calculate $2A - 3I$.
6. Let $A = \begin{bmatrix} 1 & -2 & 1 \\ -1 & 1 & 2 \\ 0 & 2 & 1 \end{bmatrix}$
 Compute $A^T * A$, $A * A^T$ are they equal.
7. Give an example of matrices using Scilab to show the following:
- $\det(A^T) = \det(A)$
 - $\det(AB) = \det(A)\det(B)$
8. Give an example of matrices in which two rows are equal. Calculate the determinant.
9. Form the matrix B from the matrix A by interchanging two rows of A. Test $\det(B) = -\det(A)$.
10. Determine the inverse of each of the following matrices.
- $A = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$
 - $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & 1 \\ 1 & 0 & 0 \end{bmatrix}$
11. Determine which of the following matrices are non-singular.
- $A = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix}$

(b) $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

12. Let A be 3×3 random matrix having integer values. Let b be the second column of A . Solve the system $Ax = b$. Try the command `format('e',20)`. Now go back to `format('v',10)`.

13. If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 1 \\ 4 & 1 & 5 \end{bmatrix}$

Find row echelon form of A by using commands on rows.

14. Interpret `linspace(2, 5, 10)`.
Try the command `format('e',20)`. Now go back to `format('v',10)`.