MATLAB: University of California, Davis

Computer LAB for Linear Algebra Dr. Daddel

MATH 22AL LAB # 6

4 Background, Reading Part :

4.1 Row vectors and column vectors

Let $B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 0 & 1 \end{bmatrix}$.

Matrix B has 2 rows and 3 columns. Each of the two rows

$$r_1 = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix}$$

and

$$r_2 = \begin{bmatrix} 4 & 0 & 1 \end{bmatrix}$$

of B are referred as a row vector of B . They are 3-tuple of real numbers, so they belong to R^3.

In general if A is a $m \times n$ matrix, then the rows of A are n-tuples of real numbers and therefore they are vectors in R^n.

Similarly the columns of B are vectors in R^2. You may write the column vectors as

$$C_1 = \begin{bmatrix} 1 \\ 4 \end{bmatrix}, \qquad C_2 = \begin{bmatrix} 2 \\ 0 \end{bmatrix}, \qquad C_3 = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$$

or as their transpose as

$$C_1^t = \begin{bmatrix} 1 & 4 \end{bmatrix}, \qquad C_2^t = \begin{bmatrix} 2 & 0 \end{bmatrix} \text{ and } \qquad C_3^t = \begin{bmatrix} 3 & 1 \end{bmatrix}.$$

or as

$$C_1 = (1, 4), \qquad C_2 = (2, 0) \qquad \text{and} \qquad C_3 = (3, 1).$$

The main idea is to understand that they are vectors in R^2.

In general if A is a $m \times n$ matrix, then the columns are m-tuples of real numbers and therefore they are in R^m.

We are interested in vector space spanned by the row vectors and vector space spanned by the column vectors of A.