MATLAB: University of California, Davis

Computer LAB for Linear Algebra Dr. Daddel

MATH 22AL LAB # 6

18 How to use MATLAB to find a basis for *col(A)* consisting of column vectors

a) Enter the following matrix A in MATLAB

$$AA = \begin{bmatrix} 3 & 9 & -7 & -2 & 6 & -3 & -1 \\ 2 & 6 & 0 & 8 & 4 & 12 & 4 \\ 2 & 6 & 5 & 18 & 4 & 33 & 11 \\ 3 & 9 & -2 & 8 & 6 & 18 & 6 \end{bmatrix}$$

2. Find $rref(AA)$ you will get

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

Leading ones are in the columns 1, 3 and 6. The corresponding columns in the original matrix AA form a basis for column space of AA.

$$\text{That is } w1 = \begin{bmatrix} 3 \\ 2 \\ 2 \\ 3 \end{bmatrix}, \quad w2 = \begin{bmatrix} -7 \\ 0 \\ 5 \\ -2 \end{bmatrix}, \quad w3 = \begin{bmatrix} -3 \\ 12 \\ 33 \\ 18 \end{bmatrix}$$

So to find a basis for the column space of A type **rref(AA)** , then find those columns of AA that correspond to the leading ones of **rref(AA)** .

End of reading Materials