

4 Background, Reading Part :

4.3 Dimension of row space, column space and Rank

Definition : The set of all linear combination of the row vectors of a $m \times n$ matrix A , is a subspace of R^n , and is called row space of A .

Note: Since the set of scalars (a quantity that can multiply vectors in the vector spaces) is infinite, we can not list all vectors in $\text{row}(A)$ or $\text{col}(A)$, we usually determine bases for them.

Definition : The dimension of the row space of A is called $\text{rank}(A)$.

Definition : The **dimension** of a vector space defined as the minimum number of coordinates needed to specify any vector within the vector space, which is equal to the number of the vectors in a basis for that vector space.

Note:

- The dimension of row space of A = The dimension of column space of A .
- If $\text{rank}(A) = n$ the row space of A is an n -dimensional subspace of R^n , so $\text{row}(A) = R^n$.
- If $\text{rank}(A) < n$ then the row vectors of A do not span R^n .
- For a matrix $A_{m \times n}$ rank of A is less than or equal to minimum of m and n .

MAT LAB could be used to find a basis for $\text{row}(A)$

End of reading Materials

Start Typing in MATLAB