Lecture - 9

- Linear independence
- Spanning a Space
- BASIS and Dimension.

Independence: Vector $x_1, x_2, x_3 \cdots x_n$ are independent if no combination gives zero vector. {except zero combination}

$$c_1x_1 + c_2x_2 + \cdots + c_nx_n \neq 0$$

Zero vector is dependent to every vector.

$V_1, V_2 \cdots V_n$ are columns of A

- They are indipendent if nullspace of A is {zero vector} | rank $= n$
- They are dependent if $Ac = 0$ | rank $< n$
  $\forall$ some non zero c.

Vector $V_1, \cdots V_l$ Span a Space means:
The Space Consists of all Combination of tose Vectors.

Basis for Space is a Sequence of vector. $v_1, v_2, \ldots, v_d$ with two properties:

(1) They are independent

(2) They Span the space.

Every basis for the space has the Same number of vectors.

Dimention of that Space

Dimention of null Space $= n - \text{Rank}(A)$

$\parallel$

no of free Variable
