

Lecture 1. The column Space of A Contains All Vectors Ax

A

$$A = CR$$

1. a column in A is a linear comb. of columns in C , R is their coefficients.
2. a row in A is a linear comb. of rows in R , C is their coefficients.

C is cols. bases of A

R is row bases of A , R is in Reduced Row Echelon Form.

采样:

对于大样本, big matrix,

How to sample a matrix?

x is a random vector, $x = \text{rand}(m, 1)$

- Ax is in column space. $\langle CA \rangle$
- $A(BCx)$ is also in column space. $\langle CA \rangle$

$A = CR$, C is a comb. of independent columns, from A .
But R is not real row of A .

Question: if we want to take real Row from A .

$$A = CUR$$