

Linear Algebra(1)

Matrices & Vectors

Linear System, Gauss Elimination

Vector Space, Subspace

Determinant of a matrix

Inverse matrix, Cramer's Rule

Linear Algebra(2)

Orthogonality

Eigenvalues & Eigenvectors

Similarity transformation

Diagonalization

Quadratic form

Vector Spaces & Subspaces

- vector spaces and subspaces in R^n
 - span of vectors
 - basis, dimension, rank
- column space and null space of a matrix
 - nullity
- existence and uniqueness of solutions
- homogeneous case
- nonhomogeneous case
- vector space in general

Vector space & Subspace(1)

- set of vectors in R^n such that

(i)

(ii)

Vector space & Subspace(2)

- $v_1, v_2, \dots, v_r \in R^n$ 의 선형결합 전체의 집합
- 행렬 A 에 대하여, $\{x \mid Ax = 0\}$

Basis of a vector space

- set of vectors v_1, v_2, \dots, v_r in a vector space V such that

(i)

(ii)

- dimension of a vector space
=

Column Space & Null Space(1)

- column space of a matrix $A \in R^{m \times n}$
- null space of a matrix $A \in R^{m \times n}$

Column Space & Null Space(1)

- dimension of column space
- dimension of null space

Existence & Uniqueness for $AX = b$

- For $AX = b$ with $A \in R^{m \times n}$ and $b \in R^m$

(1) a solution exists iff

(2) when a solution exists, it is the unique solution iff

(3)

(4) existence for any $b \in R^m$

(5) unique existence for any $b \in R^m$

Homogeneous case

Nonhomogeneous case

Vector space in general

- set of vectors with addition and scalar multiplication

For $a, b, c \in V$ and $k, l \in R$,

- set of 2 by 2 matrices
- 2 by 2 upper triangular matrices
- 2차 이하의 모든 다항식의 집합