

2020-03-22

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Chapter 1

Life, thin and light-off time and time again

Frivolous tireless

Chapter 2

Introduction

2.1 1.1

scalar

vector

$xx \qquad X \qquad X_1 \qquad X_2$

matrix

A

tensor

$A \quad \text{“A”} \quad A \quad (i,j,k) \quad A_{(i,j,k)}$

0

$/ \ /$

2.2 1.2

- “ ” “ ” $n \quad n$ “ ”
-
- 3×3
- $1 \times 1 \ 1 \times 3$

2.3 1.3

$m\ n\ \quad n\qquad m$

2.4 1.4

$\vec{a} = [-5, 6, 8, -10] \qquad \vec{x} = (x_1, x_2, \dots, x_N)$
• 1 $\vec{a} \cdot 1 = 29$

$\|\vec{x}\|_1 = \sum_{i=1}^N |x_i|$
• 2 $\vec{a} \cdot 2 = 15$

$\|\vec{x}\|_2 = \sqrt{\sum_{i=1}^N |x_i|^2}$
• $\vec{a} \cdot 5$

$\|\vec{x}\|_{-\infty} = \min |x_i|$
• $\vec{a} \cdot 10$

$\|\vec{x}\|_{+\infty} = \max |x_i|$
• p

$L_p = \|\vec{x}\|_p = \sqrt[p]{\sum_{i=1}^N |x_i|^p}$

$A = [-1, 2, -3; 4, -6, 6] \qquad A_{m \times n} \qquad a_{ij}$

$\|A\|_p := \sup_{x \neq 0} \frac{\|Ax\|_p}{\|x\|_p}$
,
• 1 , $A \cdot 1 = [5, 8, 9] \qquad 9$

- $\mathbf{2} \quad A^T A \quad A \mathbf{2} \quad 10.0623$

$$\|A\|_2 = \sqrt{\lambda_{max}(A^T A)}$$

$\lambda_{max}(A^T A) \quad A^T A \quad - \quad A \mathbf{1} \quad [616] \quad 16$

$$\|A\|_\infty = \max_{1 \leq i \leq n} \sum_{j=1}^n |a_{ij}|$$

- $\text{svd} \quad \text{---} \quad A \quad 10.9287$
- $\mathbf{L0} \quad 0 \quad \mathbf{L0} \quad 0 \quad A \quad 6$
- $\mathbf{L1} \quad \mathbf{L0} \quad A \quad 22$
- $\mathbf{F} \quad \mathbf{L2} \quad A \quad 10.0995$

$$\|A\|_F = \sqrt{(\sum_{i=1}^m \sum_{j=1}^n |a_{ij}|^2)}$$

- $\mathbf{L21} \quad \mathbf{F} \quad 2 \quad \mathbf{L1} \quad 1 \quad \mathbf{L1} \mathbf{L2} \quad A \quad 17.1559$
- \mathbf{p}

$$\|A\|_p = \sqrt[p]{(\sum_{i=1}^m \sum_{j=1}^n |a_{ij}|^p)}$$

2.5 1.5

- 0
- $C \ C^T C$
- $\begin{matrix} n \\ E \end{matrix} \quad E$
-
-
-

Chapter 3

Literature

Here is a review of existing methods.

Chapter 4

Methods

We describe our methods in this chapter.

Chapter 5

Applications

Some *significant* applications are demonstrated in this chapter.

5.1 Example one

5.2 Example two

Chapter 6

Final Words

We have finished a nice book.