Chapter 1 Introduction

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Personal statement

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Course information

- Prerequisite courses: Linear Algebra, Mathematical Analysis,
 Data Structure and Algorithm;
- Book: Timothoy Sauer, Numerical Analysis 3rd Edition;
- Contents: 4 chapters: 2, 3, 4 and 12 (Intelligence Science, 2 points).





Liangda Fang 3/ 10

Course requirements

- 10 homeworks
- 1 tests costs 140 mins;
- Date of test: To be determined.





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- 1 tests costs 140 mins;
- Date of test: To be determined.
- 4 experiments (each for Chapter 2, 3, 4 and 12);
- 1 team with at most 2 students.





Introduction to Numerical Analysis

• Which problems does it investigate?





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Introduction to Numerical Analysis

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- We have a machine:
 - encodes finite real numbers ($2^{64} \approx 18.446 \times 10^{18}$ real numbers);
 - ② for a range of real numbers ($\pm 2.23 \times 10^{-308}$ to $\pm 1.80 \times 10^{308}$), it have an approximate representation;
 - Supports addition, subtraction, multiplication and division of two real numbers.





Introduction to Numerical Analysis

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 - supports addition, subtraction, multiplication and division of two real numbers.
- Problems:
 - Solve a linear equation;
 - Find an eigenvalue of a matrix;
 - Generate a function that matches some given points;
 - Evaluate an integral;
 - **5** Solve an ordinary (or partial) differential equation.



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Applications: Search engine









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Applications: Deep learning







Liangda Fang 7/ 10

Applications: Pattern recognition







Applications: Investment analysis







Thank you!



