Introduction

- Numerical analysis concerns about two things:
  - ◇ Design the *process* by which mathematical problems can be solved by the operations of arithmetic (+, -, *, /).
  - ◇ Choose the procedure which is *best* suited to the solution of a particular problem.
- These concerns lead to the central theme in almost every of part of numerical analysis: to control and to assess the errors.
- Where do errors come from?
  - ◇ Errors inherent in the mathematical formulation of the problems, such as
    1. The error incurred when the mathematical statement of a problem is only an approximation to the physical situation;
    2. The error due to inaccuracies in the physical data.
  - ◇ Errors incurred in the numerical computation process, such as
    1. Programming blunder;
    2. Truncation error, i.e., inexact evaluation of mathematical operators;
    3. Roundoff errors, i.e., inexact arithmetic calculations.