Lecture 02

Deterministic vs Stochastic Systems:

- classical laws of physics → deterministic

- a coin flip → stochastic?

- why don't some systems repeat themselves?

- stochastic systems are often convenient

Examples of Statistical Practice:

- sample surveys - results of opinion polls

- business - selling airline tickets?

- agriculture - how to optimize yield?

- population biology - how many fish?

- education - comparing learning techniques

- sports - handicapping in golf

- sports - when should the goalie be pulled?

- health - longitudinal studies

- experimental design

1. Descriptive Statistics:

- addresses the following problem

  – given some data, try to understand it

- the data can be a *sample* or a *population*

  – eg: the weights of STAT270 students in kg

- descriptive statistics is summarization

- summaries can be *numerical* or *graphical*

  – eg:

2. Inferential Statistics:

- addresses the following problem

  - given a sample, try to understand popln

- mathematical vs inferential reasoning

  - mathematical reasoning (general $\rightarrow$ specific)

  - inferential reasoning (specific $\rightarrow$ general)

  - eg

  - eg

- inferential reasoning uses probability theory