Statistical Methods

統計方法

September 5, 2023

Instructor: I-Chen Lee

Statistical Methods

- Course time: Tuesday 09:10~12:00
- At 62227, Department of Statistics
- Email: iclee@ncku.edu.tw
- Office hour: Tuesday afternoon

- TA: 徐瑋柔
- Office hour:

Course Objectives

- To be familiar with fundamental statistical analysis.
- To be able to apply the statistical models to real examples.
- To be able to use statistical software R to analyze data.

Course Content

- Lots of statistical methods
  - Basic statistical procedures
  - Basic modeling and statistical inference
  - Methods for comparison (t-test, F-test, correlation, …)
  - Methods of estimation (LSE, MLE, BE, MAP)
  - Modeling (linear, nolinear, fixed/random effects, GLM)
  - Multivariate analysis (PCA, FA, LDA)
  - Non-regular data type (lifetime data, mixed model)
  - …
- Software:
  - R (with Rstudio)
  - SPSS
  - Latex (www.overleaf.com)

Grading Policy

- Homework: 30%
- Group presentation (in English): 35%
- Final Exam: 35%
  - Final report (in English): 10%
  - Exam: 25%

Textbook

1. Cleff, T. (2014). ***Exploratory Data Analysis in Business and Economics****.* Springer Cham
2. Gareth, J., Daniela, W., Trevor, H., & Robert, T. (2013). ***An introduction to statistical learning: with applications in R***. Spinger.
3. Maurits; Van Den Heuvel Kaptein (Edwin). (2022). ***Statistics for Data Scientists: An Introduction to Probability, Statistics, and Data Analysis***. Springer.

Reference

- Venables and Ripley (2002), ***Modern Applied Statistics with S***, Springer Science & Business
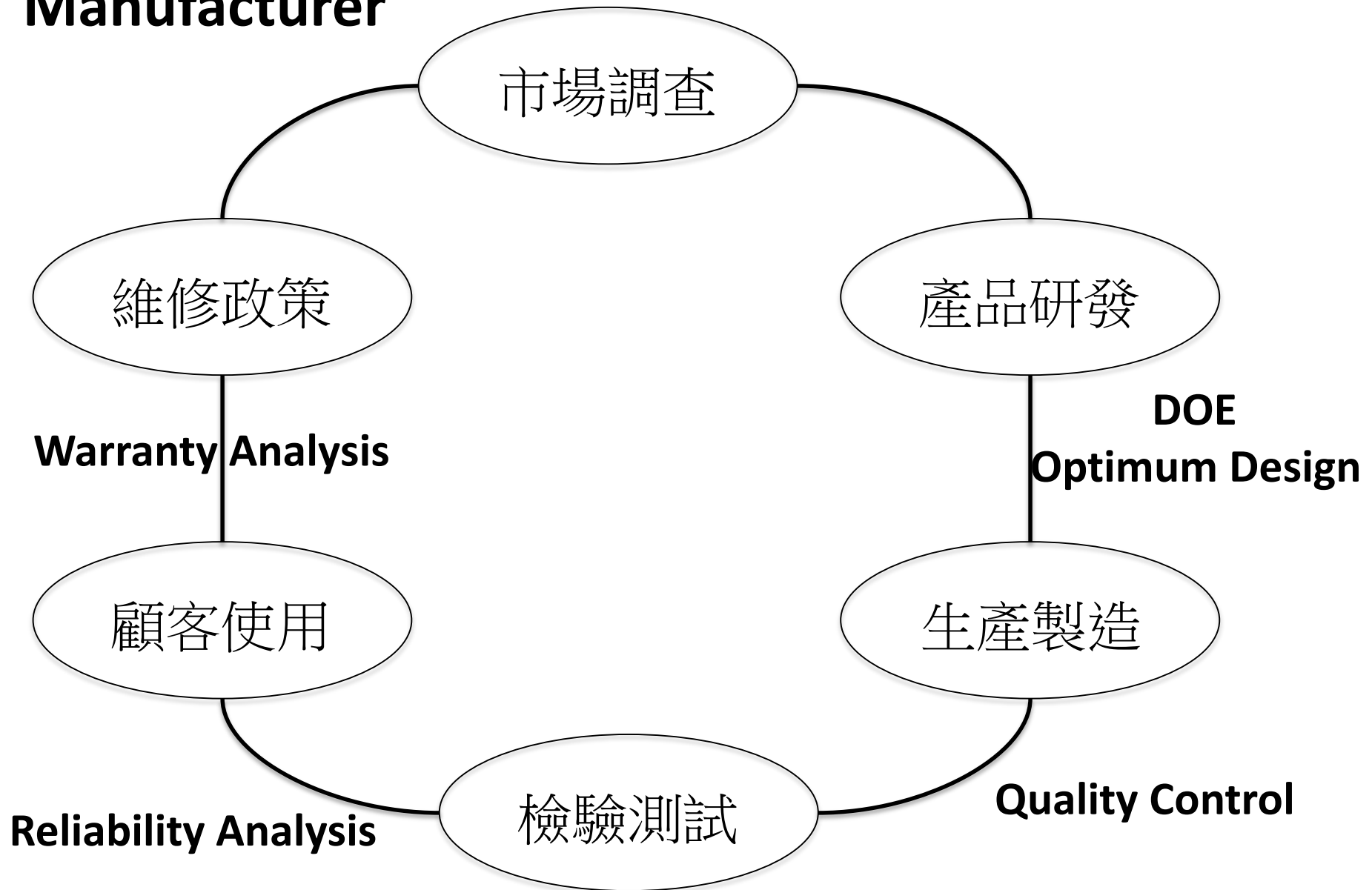- Akinkunmi (2019), ***Introduction to Statistics Using R***.

Survey

- https://forms.gle/un6nQv1ANoXuPaF19

Introduction to myself

- I-Chen Lee (李宜真)

- https://researchoutput.ncku.edu.tw/en/persons/i-chen-lee/publications/

- Research interests:
  - Reliability analysis
  - Industrial Statistics
  - Optimal design

Manufacturer

市場調查

維修政策

產品研發

DOE
Optimum Design

Warranty Analysis

顧客使用

生產製造

Reliability Analysis

檢驗測試

Quality Control
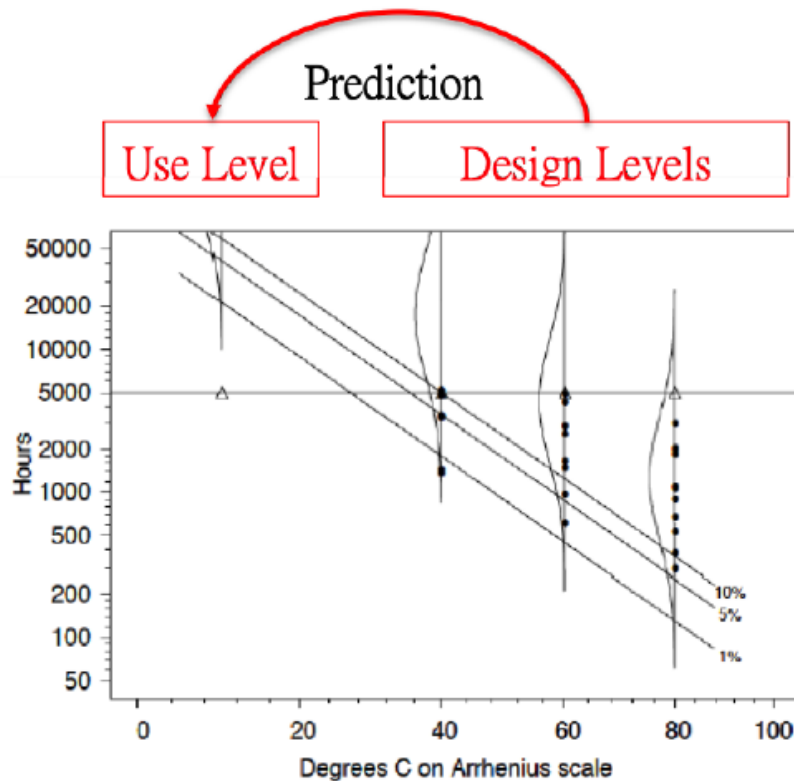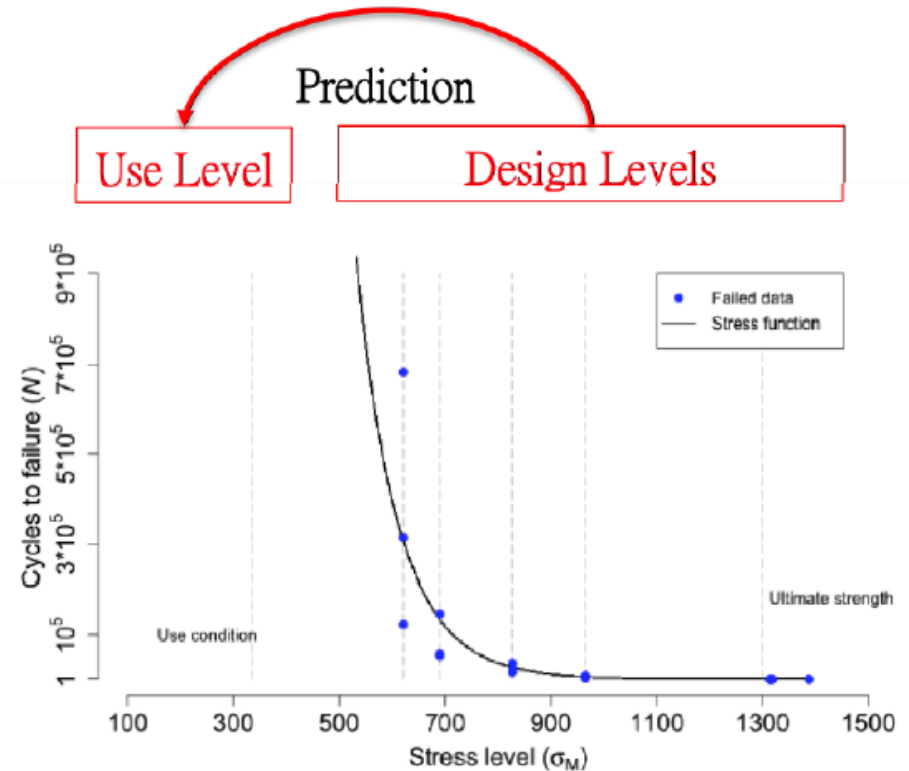
Purposes

- Objects: Products, components, systems,…
- What are the keywords?
  - ✓ Good quality
  - ✓ Accurate
  - ✓ Precise
- Constraints:
  - ✓ Budget
  - ✓ Time

Accelerated life tests

(a) Device A (Meeker&Escobar, 1998)

(b) Polymer Composite Material