Multivariate Analysis

Special Subjects
Elective 2 credit

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1. Course Description

First you will review basic statistic technique. Second you will study multivariate techniques such as regression analysis, principal component analysis, discriminant analysis, cluster analysis, etc. You will understand the theories to interpret the analysis results. You will also obtain the ability to apply the multivariate analysis technique through case studies and exercises using computer software.
This subject corresponds to the diploma policy DP3.

2. Course Objectives

As multivariate is widely applied to various fields including science and technology, you will be able to understand basic techniques of statistic and multivariate, and you will be able to apply them to practical problems.

3. Grading Policy

Your overall grade in this class will be decided based on the final examination.
The two reports are required to receive the right to take the final examination, and the results of the two report are not considered for your overall grade.

4. Textbook and Reference

Textbook
Noguchi "Zukai to suuti-rei de manabu tahenryoukaiseki-nyuumon", ISBN: 978-4-542-60112-3.

Japanese Standard Association
Reference
Nagata and Munechika "Introduction to Multivariate Analysis", ISBN: 978-4781909806. Science-sha
You can find various books dealing with multivariate analysis for your personal purpose.
The lecture materials will be posted on LMS.
We will use Microsoft Excel for computer exercise so that you can use it after this lecture.

5. Requirements(Assignments)

It is desirable that you understand mathematical statistics and linear algebra of undergraduates. You should review the exercises for each technique of multivariate analysis and apply them in your own problems.

6. Note

The above materials given at "4. Textbook and Reference" are enough to understand the digest of multivariate analysis. However, if you plan to apply multivariate analysis to research or practical use, you should read carefully books about multivariate analysis with the titles which contain the field that you want to apply, and you should take exercises with practical data as possible.

7. Schedule

[1] Introduction and basic statistical technique (1): how to summarize in statistics
[2] Basic statistical technique (2): correlation analysis
[3] Basic statistical technique (3): foundation of probability distribution and normal distribution
[4] Basic statistical technique (4): inference and test
[5] Basic statistical technique (5): how to select statistical models
[6] Regression analysis(1): single regression analysis and formulation
[7] Regression analysis(2): important points for single regression analysis
[8] Regression analysis(3): multiple regression analysis and formulation
[9] Regression analysis(4): important points for multiple regression analysis and variable selection method
[10] Regression analysis(5): how to handle qualitative variables and linear algebra essential for multivariate analysis
[11] Regression analysis(6): logistic regression
[12] Discriminant analysis
[13] Principal component analysis
[14] Cluster analysis: hierarchical method and nonhierarchical method
[15] Summary and examination