統計学Ⅳ (Statistical AnalysisⅣ)

科目ナンバリング　ECS-204
選択必修　2単位

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1. 授業の概要(ねらい)

Based on the topics covered in "Statistical Analysis III," we will continue studying the statistical inference such as joint random variables, point and interval estimations, hypothesis testings, regression analysis and introductory Bayesian method. We will solve some exercises to understand more deeply the materials covered in each class.

2. 授業の到達目標

After finishing this course, you will be able to understand
- the estimation of the parameters,
- the logic of hypothesis testings,
- how to use the regression model,
- Bayesian Statistics.

3. 成績評価の方法および基準

There will be two exams: midterm and final. Each exam has the following weight: Midterm 30-40%, Final 60-70%.
There might be some assignments (up to 10% of your final grade).

4. 教科書・参考文献

教科書
Lecture notes will be distributed for each class.

5. 準備学修の内容

Read through the lecture notes to clarify ambiguous points before attending the class.
Review the examples and exercises in the lecture notes covered in each class.

6. その他履修上の注意事項

Feel free to ask any questions during the class (or after the class / by email) so as not to leave them unanswered.
The schedule is subject to change.

7. 授業内容

【第1回】　Introduction.
Review of the topics in the "Statistical Analysis III."
【第2回】　Jointly Distributed Random Variables (1): Conditional Distributions and Independence; Expected Values and Moments.
【第3回】　Jointly Distributed Random Variables (2): Sums of Random Variables; Chebyshev Inequality and the Law of Large Numbers.
【第4回】　Jointly Distributed Random Variables (3): Central Limit Theorem and Probability Law Approximations; Some Special Distributions.
【第5回】　Descriptive Statistics and Inferential Statistics.
【第6回】　Estimation of Parameters (1): Method of Moments and Maximum Likelihood; Properties of Estimators.
【第7回】　Estimation of Parameters (2): Confidence Intervals and Two-Sample Procedures.
【第8回】　Midterm Examination
【第9回】　Explanation of Midterm Examination (ONLINE)
【第10回】　Hypothesis Testings (1): Simple Hypotheses and Composite Hypotheses.
【第11回】　Hypothesis Testings (2): Some Two-Sample Tests.
【第12回】　Regression Analysis (1): Least Squares Estimation.
【第13回】　Regression Analysis (2): Interval Estimation and Tests of Hypotheses.
【第14回】　Bayesian Statistics (1): Prior and Posterior Distributions.
【第15回】　Bayesian Statistics (2): Bayesian Estimators and Bayesian Intervals.