Graduate Methodologies in Cognition, Mathematics and Information S1

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【Course description and aims】

The theme of this course is “Decision Making Models.” This course deals with mathematical methods for modeling and analyzing competitive or social decision making situations through discussion, group work, lectures and working on exercise problems. Specifically, this course gives definitions, examples and analysis methods of “games in normal form,” “games in extensive form,” “option form,” “graph models,” “simple games,” “games in characteristic function form,” and “committees.” These are mathematical models for describing and analyzing decision making situations, which the students are expected to understand upon completion of this course.

This course aims to cultivate the students’ abilities to:

- select an appropriate mathematical model for describing and analyzing a focal decision making situation;
- describe a real-world decision making situation by a mathematical model;
- analyze the mathematical model and draw some insights on the situation from the results of the mathematical analysis; and
- convey the mathematical analysis results to others concisely.

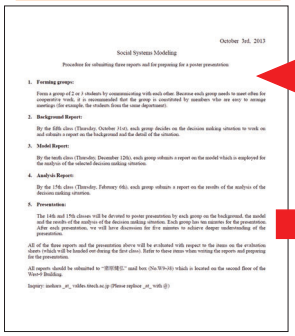
【Three Reports and a Poster Presentation】

Students are required to submit three reports:

1. Background Report:
   On the background and the detail of a real-world decision making situation;
2. Model Report:
   On the model of the situation;
3. Analysis Report:
   On the analysis of the situation.

Also, they are required to give a poster presentation based on these reports at the end of the term.

【Instructions】


October 3rd, 2013

Social Systems Modeling

Procedure for submitting three reports and for preparing for a poster presentation:

1. **Forming groups:**
   Form a group of 2 or 3 students by communicating with each other. Because each group needs to meet often for cooperative work, it is recommended that the group is constituted by members who are easy to arrange meetings (for example, the students from the same department).
2. **Background Report:**
   By the fifth class (Thursday, October 31st), each group decides on the decision making situation to work on and submits a report on the background and the detail of the situation.
3. **Model Report:**
   By the tenth class (Thursday, December 12th), each group submits a report on the model which is employed for the analysis of the selected decision making situation.
4. **Analysis Report:**
   By the 13th class (Thursday, February 6th), each group submits a report on the results of the analysis of the decision making situation.
5. **Presentation:**
   The 14th and 15th classes will be devoted to poster presentations by each group on the background, the model and the results of the analysis of the decision making situation. Each group has ten minutes for the presentation. After each presentation, we will have discussion for five minutes to achieve deeper understandings of the presentation.

All of the three reports and the presentation slides will be evaluated with respect to the items on the evaluation sheets (which will be handed out during the first class). Refer to these items when writing the reports and preparing for the presentation.

All reports should be submitted to “情報棟E1” mail box (No.W9-01) which is located on the second floor of the West-9 Building.

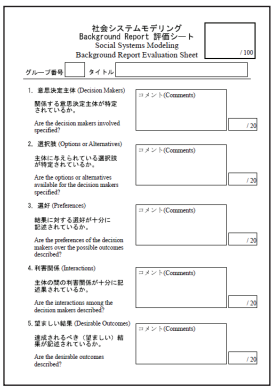
Inquiry: inohara_at_valdes.titech.ac.jp (Please replace _at_ with @)

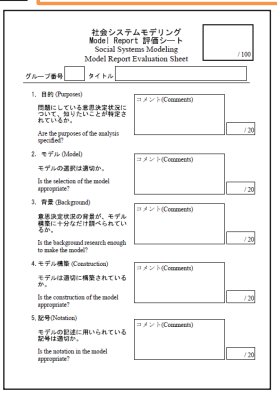
【Evaluation】

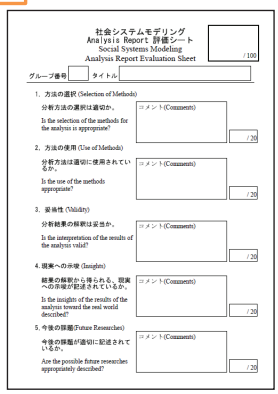
Evaluation will be based on;

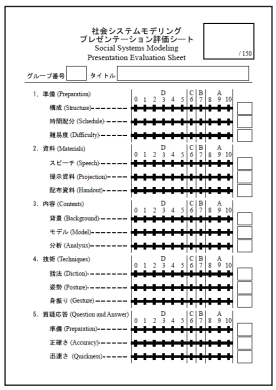
1. Three reports (20% each);
2. Three reports (10% each; 30% total);
3. Poster (20%); and
4. Presentation (20%)

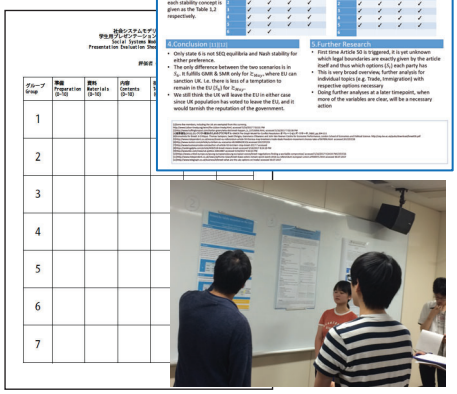
【Evaluation Sheets】

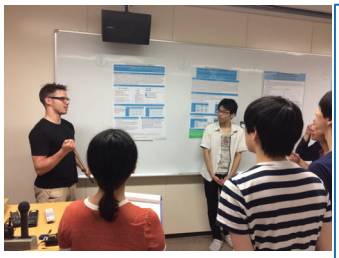

社会システムモデリング
Background Report 評価シート
Social Systems Modeling
Background Report Evaluation Sheet

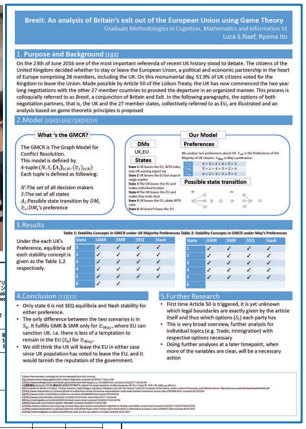

社会システムモデリング
Model Report 評価シート
Social Systems Modeling
Model Report Evaluation Sheet


社会システムモデリング
Analysis Report 評価シート
Social Systems Modeling
Analysis Report Evaluation Sheet


社会システムモデリング
プレゼンテーション評価シート
Social Systems Modeling
Presentation Evaluation Sheet






Brexit: An analysis of Britain’s exit out of the European Union using Game Theory
Graduate Methodologies in Cognition, Mathematics and Information S1
Luca S. Nuef, Ryoma Ito

【Examples of Report Topics】

Brexit: An Analysis of Britain’s exit out of the European Union using Game Theory
Analysis for Falsely Accusation on the Train

【Schedule and Class room】

Every Friday, 10:45-12:15, Room W9-707

Class 1 :	Guidance
Class 2 :	Games in normal form: Definition, Dominant strategy equilibrium and Nash equilibrium
Class 3 :	Games in extensive form (1): Definition
Class 4 :	Games in extensive form (2): Backward induction and subgame perfect equilibrium
Class 5 :	Option form: Definition and Stability concepts
	The deadline for submitting Background Report
Class 6 :	Graph models (1): Definition and Transition time analysis
Class 7 :	Simple games and weighted majority games (1): Definition
Class 8 :	Simple games and weighted majority games (2): Dictator, veto, unanimity, properness and symmetry
Class 9 :	Simple games and weighted majority games (3): Power indices and coalition power comparison
Class 10 :	Games in characteristic function form (1): Definition
	The deadline for submitting Model Report
Class 11 :	Games in characteristic function form (2): Core, Shapley value and nucleolus
Class 12 :	Committees (1): Definition
Class 13 :	Committees (2): Stable alternatives
Class 14 :	Presentation (1)
Class 15 :	Presentation (2)
	The deadline for submitting Analysis Report