

**【 Course Title 】** Human Economic Science by Mathematica

Introduction

**【 Syllabus 】**

<http://www.ihes.hum.titech.ac.jp/Syllabaus-Mathematica-2009-final.pdf>

**【 Lecturer 】**

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Research Topics: Language Theory and Practice

- 1) Computational linguistics,
- 2) Cognitive linguistics,
- 3) Humanities computing,
- 4) Educational technology or kansei technology

**【 Credit 】** 0-2-0

**【 Textbook Reference 】** No textbook is required.

All the course materials can be downloaded from the site of the Educational Computer System (available only inside the campus.)

<http://www.b.cc.titech.ac.jp/~39499864/Mathematica/>

The documents published by Tokyo Tech OCW transmit only the flavor of this course, because the information relating the computer system and the details of explanation were all removed from them.

**【 Background of this class 】**

Practical session using the Educational Computer System in GSIC (iMac & Linux)

A part of the International Human Economic Science (IHES) Special Course.

<http://www.ihs.hum.titech.ac.jp/>

You will earn the certificate of IHES if you get 8 credits from this special course (The declaration is needed when you earn your degree.)

**【 Aim of Lecture 】**

Mathematica is a highly ingenious, extremely precise and among others user-friendly programming language. From the standpoint of the human economic science, it is the most suitable for 1) complicated symbolic computation including vast amounts of terms, 2) analytical or numerical solutions of equations, differential equations or minimization calculation, 3) accurate and aesthetic visualization of graphs or figures. In this class, we provide practices using GSIC Educational System and Tsubame Grid Cluster to learn how to manipulate "Mathematica", which is necessary for the calculation of economics or cognitive psychology such as solution to equations, linear algebra (list, vector and matrix manipulation), statistics (Descriptive statistics, Regression, Anova), graphs and complex network, and simulation of complex systems.

**【 Plan of Lecture 】 (tentative):**

Procedures to Get Tsubame Account and Introduction to Tsubame Literacy

Mathematica, its features and interfaces--Symbolic Programming, Use of Notebook and "math" command for Tsubame computation

Numerical Calculation and Algebraic Calculation

List Vector and Matrix (1)

List Vector and Matrix (2)

2 D and 3 D Graphics

Sparse Array and others

The Condition controls

Statistical Analyses

Complex Networks

Differential Equation and others

Practices of More Advanced Programming (1)

Practices of More Advanced Programming (2)

Practices of More Advanced Programming (3)

**【 About Educational Computer System 】**

GSIC Practice Room n.2: 28 sets of iMac (56 set in n.1)

To get your account, fill in the document we distribute for the declaration of your status

information.

The system is available in Practice Room n.1 and n.2 from 8:45~17:00 on weekdays except when they have a class and the room is occupied by audience.

Educational Computer System Architecture:

Your home directory is not settled in a terminal but in the unified system of the file server, so you can choose any spare terminal you want in the room. Your environment is conserved and accessible from any terminal.

The OS (operating system) is booted by mounting through network the boot image stored in the boot server.

Once you got your account, it is available for one year in the other classes using the Educational Computer System.

【Score】 Attendance and reports

【Comments from Lecturers】

This lecture will be held from April the 14<sup>th</sup> on every Tuesday, 13:20~14:50 (Time Slots: 5-6) at the 2nd Practical Room of Global Scientific Information and Computing Center (GSIC) (3rd floor). The access information can be found at the following URLs.

<http://www.gsic.titech.ac.jp/contents/campusmap.html.ja>

<http://www.gsic.titech.ac.jp/contents/campusmap.html.en>

No special knowledge on Mathematica is required.

For the more detailed information on the course, please refer to

<http://www.ihes.hum.titech.ac.jp>

and feel free to send an email to Prof. Akama (akama@dp.hum.titech.ac.jp)

The credit of this course can be used to complete the International Human Economic Science Special Course which will start in April, 2009.