1 Lecture - Introduction of the course, Eigenvalue problem

1.1 Introduction of the course

- name of the course: Linear Algebra II X
- instructor name: Jan Brezina
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- room: main building H219
- teaching assistant: Murakami (murakami.h.ah@m.titech.ac.jp, H316)

About lecture

- purpose of the course: develop an abstract version of what we learned in Linear Algebra I
- advantage over other courses - math and English
- why English: thinking in another language gives you new ways of looking at things
- course is optional, however if you take it then you must take both lecture and exercise
- class is in English, tests too
- content is similar to Japanese classes

Class materials

- personal notes
- Linear Algebra: A Modern Introduction (3rd or newer edition) by David Poole, can be found in Titech library
- handouts - photocopies of parts of the book will be distributed at exercise session
- any book in any language you find and like

Grading

- score 60 - 100 points is a pass
- depending on a person - just pass or care about good score - your choice
- **Grades from lecture and exercise are not related!**

Lecture grading

Midterm exam	50 points
Final exam	50 points

- midterm exam - October 31st
- final exam - November 21st
- no reexamination possible!

Exercise grading

- 6 short tests,
- grade is calculated by averaging 5 best tests
- 10-15 minutes
- if you cant do short tests it indicates you dont follow the class properly and should work harder

Publishing of materials

- weekly on OCW-i,
- content of lectures and exercises, tests with solutions, etc.

Consultation

- always welcome to consult with me or TA
- setup an appointment (personally, by email)
- preferably come in group
- consult with classmates
- pay attention throughout the quarter, cramming do not work in math!

1.2 Lecture - Eigenvalue problem

- quick overview of the eigenvalue problem
- definition of an eigenvalue and an eigenvector,
- Example 4.1,
- Example 4.2,
- definition of the eigenspace,
- Example 4.5,
- Example 4.6,
- Example 4.7
- decide for which eigenvalues to look - real, complex, modulo spaces.
- The eigenvalues of a square matrix A are precisely the solutions λ of the equation

$$\det(A - \lambda I) = 0.$$

- definition of the characteristic polynomial and the characteristic equation of A,
- procedure to find eigenvalues and eigenvectors,
- Example 4.18,
- algebraic and geometric multiplicity of eigenvalues.