

Linear Algebra

Syllabus Number 4B104

Basic Major Subjects

Elective 2 credit

WATANABE, Ryuji

1. Course Description

This course provides an introduction to linear algebra necessary in the following mathematical courses and specialized courses. The items are as follows: Matrix, linear transformation, inverse matrix, determinant, inverse matrix and simultaneous linear equations, diagonalization and Eigen values of matrix, and linear independency of vectors.

The classes are based on self-learning to read the designated text books and to answer the practice exercises prepared in each unit of the guidance book.

This subject is related to the clause 1 of the diploma policy of the Department of Information Science Correspondence Course.

2. Course Objectives

This course aims to improve the students' basic knowledge of mathematics used by scientists and engineers and to enhance their overall mathematical levels by solving mathematical problems so that they can study textbooks in specialized courses on their own.

3. Grading Policy

The acceptance line is accuracy rate of 60% in the final exam.

The midterm papers(40%) and the final exam (60%) will be evaluated.

4. Textbook and Reference

Textbook

Y.Tashiro "Engineering Mathematics: Linear Algebra (2nd edition)" Morikita Publishing (1999) in Japanese. (ISBN 4-627-04922-6)

Reference

M.Toda and N.Asano "Matrix and Linear Transformation" Iwanamishoten (1989) in Japanese. (ISBN 4-00-007772-4)

S.Ishihara and S.Asano "Introduction to Linear Algebra" Shokabo (1995) in Japanese. (ISBN 978-4-7853-1093-6)

5. Requirements(Assignments)

Answering the practice exercises prepared in each unit of the guidance book is required as the midterm papers.

Preparation of figures and equations and vectors on a high school level is also required.

6. Note

The assignments should be prepared by handwriting.

It is prohibited for students to refer the textbook and notebook in the final exam.

7. Schedule

- [1] Matrix : Definition of matrix
- [2] Matrix : Operation of matrix
- [3] Linear transformation : Definition of linear transformation
- [4] Linear transformation : Product of linear transformation
- [5] Inverse matrix : Simultaneous linear equations, Inverse matrix
- [6] Inverse matrix : Inverse transformation of linear transformation
- [7] Determinant : Definition of determinant
- [8] Determinant : Properties of determinant
- [9] Determinant : Expansion of determinant, Determinant of the product of matrices
- [10] Inverse matrix and Simultaneous linear equations : Inverse matrix of the n-dimensional square matrix
- [11] Inverse matrix and Simultaneous linear equations : Cramer's formula, Sweep method
- [12] Linear independency of vectors : Simultaneous homogeneous linear equations
- [13] Linear independency of vectors : Linear independent and dependent, vector products
- [14] Diagonalization and Eigen value : Eigen value, Diagonalization
- [15] Diagonalization and Eigen value : Symmetric matrix, Orthogonal matrix