

EE2030010 Linear Algebra
(線性代數)
Spring 2018

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Linear algebra is a branch of mathematics that deals with vector spaces and linear transformations. This theory is the foundation of many areas in pure and applied mathematics including functional analysis, differential geometry, multidimensional calculus, graph theory and etc. The concepts, tools and specifically the language of linear algebra are absolutely essential and widely used in engineering, physics, economics and social sciences, and natural sciences. For instance, optimization in general and convex optimization in particular is mainly based on the linear algebra and matrix analysis which provide a great language to translate a described optimization problem into mathematical formulations for further analysis. The main goals for this course are *to understand the fundamental concepts in linear algebra from vector space to linear transformations and to enhance the students' critical thinking and reasoning by learning and writing logical proofs*. Various applications of linear algebra in different areas will also be addressed.

Units: 3

Lecture hours: **W3, W4, F3, F4**

Classroom: **Delta 210**

Course website: <http://www1.ee.nthu.edu.tw/cychi/teaching/courses.php>

Outline:

1. Vectors and Matrices
2. Systems of Linear Equations
3. Vector Spaces and Subspaces
4. Inner Products and Orthogonality
5. Matrix Inversion and Determinants
6. Diagonalization
7. Eigenvalues and Eigenvectors
8. Linear Transformations
9. Applications

Textbook:

G. Strang, *Introduction to Linear Algebra*, Wellesley-Cambridge Press, 4th or 5th Ed, 2009 (歐亞書局 (02) 8912-1188)

References:

S. H. Friedberg, A. J. Insel, and L. E. Spence, *Linear Algebra*, 4th ed., Prentice Hall, 2003.

Grading scheme:

Homework: 20%

Midterm Examination: 40% (date to be determined)

Final Examination: 40% (date to be determined)

Teaching Assistants:

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