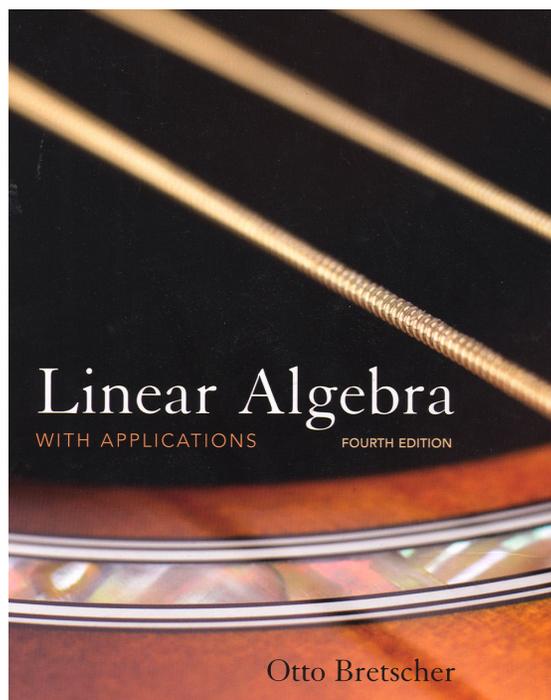


TEXTBOOK



Book: Otto Bretscher, Linear Algebra with Applications, 4th edition 2009, ISBN-13:978-0-13-600926-9. You need the 4th edition for the homework Student solution manual optional.

SECTIONS

The course lectures (except reviews and intro meetings) are taught in sections. This assures you can discuss the material in class. Additional problem sessions as in math21a. Sections: MWF 10, MWF 11, MWF 12, TTH 10-11:30, TTh 11:30-13:00. MQC: 309

SECTIONING

START	END	SENT
MO JAN 26	THU JAN 29	FRI JAN 30
7 AM	12 PM	5 PM

More details:

<http://www.math.harvard.edu/sectioning>

IMPORTANT DATES

INTRO	1.EXAM	2.EXAM
28. JAN	3.MARCH	7. APRIL
8:30 AM	7 PM	7 PM
SCB	SCC	SCC

GRADES

PART	GRADE 1	GRADE 2
1. HOURLY	20	20
2. HOURLY	20	20
HOMEWORK	20	20
LAB	5	
FINAL	35	40

MATH21B

SYLLABUS 2009

Linear Algebra and Differential Equations is an introduction to linear algebra, including linear transformations, determinants, eigenvectors, eigenvalues, inner products and linear spaces. As for applications, the course introduces discrete dynamical systems and provides a solid introduction to differential equations, Fourier series as well as some partial differential equations. Other highlights include applications in statistics like Markov chains or data fitting with arbitrary functions.

PREREQUISITES

Single variable calculus. Multivariable like 21a is advantage.

ORGANIZATION

Course Head: Oliver Knill

knill@math.harvard.edu

SC 434, Tel: (617) 495 5549

CALENDAR

DAY TO DAY

SYLLABUS

Intro Meeting

Classes start

SU	MO	TU	WE	TH	FR	SA
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	1	2

Exams

Holidays

1. Week: Systems of linear equations

- Lect 1 2/2 1.1 introduction to linear systems
- Lect 2 2/4 1.2 matrices and GaussJordan elimination
- Lect 3 2/6 1.3 on solutions of linear systems

2. Week: Linear transformations

- Lect 4 2/9 2.1 linear transformations and inverses
- Lect 5 2/11 2.2 linear transformations in geometry
- Lect 6 2/13 2.3-4 matrix product and inverse

3. Week: Linear subspaces

- Lect 7 2/16 Presidents day, no class
- Lect 8 2/18 3.1 image and kernel
- Lect 9 2/20 3.2 bases and linear independence

4. Week: Dimension and linear spaces

- Lect 10 2/23 3.3 dimension
- Lect 11 2/25 3.4 coordinates
- Lect 12 2/27 4.1 linear spaces

5. Week: Orthogonality

- Lect 13 3/1 review for first midterm
- Lect 14 3/3 4.1 linear spaces II
- Lect 15 3/5 5.1 orthonormal bases projections

6. Week: Datafitting

- Lect 16 3/8 5.2 Gram-Schmidt and QR factorization
- Lect 17 3/10 5.3 orthogonal transformations
- Lect 18 3/12 5.4 least squares and data fitting

7. Week: Determinants

- Lect 19 3/15 6.1 determinants 1
- Lect 20 3/17 6.2 determinants 2
- Lect 21 3/19 7.1-2 eigenvalues

Spring break 3/22-3/28

8. Week: Diagonalization

- Lect 22 3/29 7.3 eigenvectors
- Lect 23 4/31 7.4 diagonalization
- Lect 24 4/2 7.5 complex eigenvalues

9. Week: Stability and symmetric matrices

- Lect 25 4/5 Review for second midterm
- Lect 26 4/7 7.6 stability
- Lect 27 4/9 8.1 symmetric matrices

10. Week: Differential equations

- Lect 28 4/12 9.1 differential equations I
- Lect 29 4/14 9.2 differential equations II
- Lect 30 4/16 9.4 nonlinear systems

11. Week: Function spaces

- Lect 31 4/19 4.2 linear trafos on function spaces
- Lect 32 4/21 9.3 linear differential operators
- Lect 33 4/23 5.5 inner product spaces

12. Week: Partial differential equations

- Lect 34 4/26 5.5 Fourier theory I
- Lect 35 5/28 5.5 Fourier theory II
- Lect 36 5/30 Partial differential equations