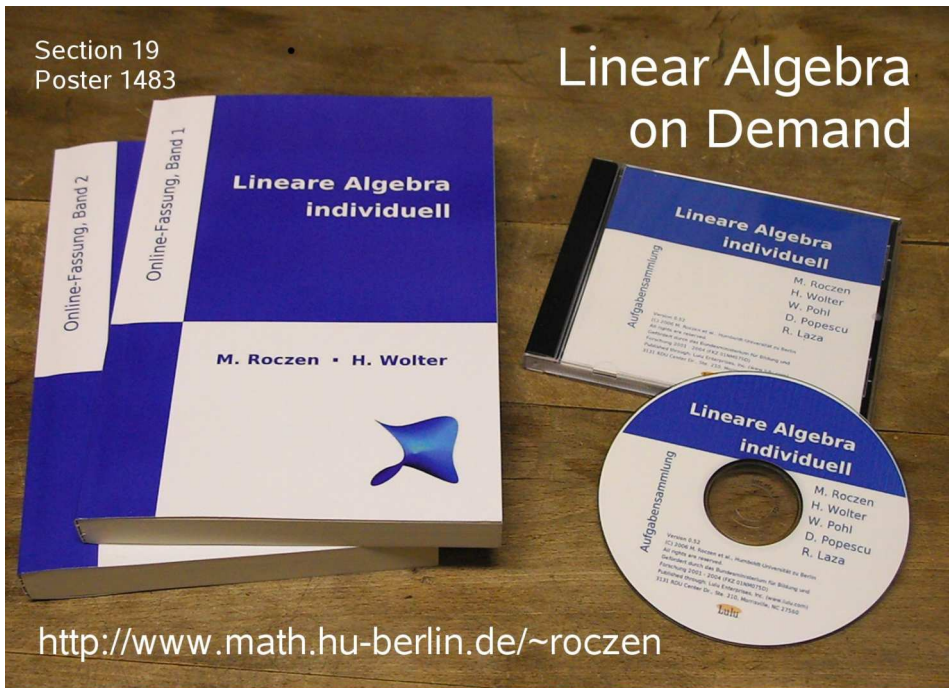


Section 19
Poster 1483

Linear Algebra on Demand



<http://www.math.hu-berlin.de/~roczen>

This is a combination of different media for teaching linear algebra. It aims to adapt to the students needs in an optimal way using classical and electronic means. The online-version generates random exercises and assembles context-dependent scripts in various levels of difficulty.

Teaching mathematics is undergoing dramatic changes since computers are becoming part of our daily life. Starting from school, students have less and less motivation to perform calculations 'by hand'. By contrast, there is an increasing demand to understand what is behind algorithms. Mathematicians may consider this development an advantage, giving evidence of increasing importance of our discipline as a 'key technology' in society.

But is it really necessary -- say, for an engineer -- to understand subtle questions of pure mathematics related to basic notions he or she uses in day-to-day work? In fact, given a concrete problem, this may be false today and true tomorrow.

The material presented here includes a variety of possibilities to learn notions and results of linear algebra. As online text, generated on demand, it includes -- without lacking exactness -- different levels of difficulty, presenting theorems under stronger assumptions for the beginner or in greater generality for an ambitious student.

Apparently, an upgrade of knowledge, acquired at the beginning, can be much easier achieved if you simply have to switch a button and obtain (with equal notations)

a new hyper-text document written in a personalised way: including more or less of the necessary basics, examples, additional comments, etc.

The material is accompanied by a collection of exercises, some of them generated with random initial values and - if requested -- equipped with detailed solutions. The online-output is computed and assembled using the computer algebra - system Singular [1].

Textbooks [2] and a CD-ROM edition of exercises [3] offer a complete basic course on linear algebra, which can be used independently, as well. Applying computer algebra is suggested and trained here at an early state.

The material has been successfully tested at Humboldt-Universität zu Berlin for students of mathematics and informatics. Recently, the material is available in German. Some parts (related to the collection of exercises) still have to be considered as work in progress.

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References

- [1] Greuel, G.-M., Pfister, G., Schönemann, H., Singular Reference Manual. Reports On Computer Algebra 12, May 1997, Center for Computer Algebra, University of Kaiserslautern, <http://www.singular.uni-kl.de>
- [2] Roczen, M., Wolter, H., Lineare Algebra individuell, vol. 1, 2. Lulu, Morrisville NC, 2005 (ISBN 1-4116-2648-6 and ISBN 1-4116-3558-2)
- [3] Roczen, M., Wolter, H., Pohl, W., Popescu, D., Laza, R., Lineare Algebra individuell – Aufgabensammlung (CD-ROM Fassung, Ver. 0.52), Lulu, Morrisville NC, 2006.

Mathematics Subject Classification (MSC 2000): 15-01

Texte und Aufgaben zur linearen Algebra - Mozilla Firefox

Online-Lehrmaterial

M. Roczen · H. Wolter

Aufgabensammlung unter Mitarbeit von

W. Pohl · D. Popescu · R. Laza

Lineare Algebra individuell - Mozilla Firefox

Online-Lehrmaterial

Kapitel 0: MENGENLEHRE UND LOGIK

Eine Einführung

Mengen Logische Grundbegriffe

START - SKRIPT ERZEUGEN

http://hades.nirwana.mmm - Lineare Algebra individuell - Steuerung - Mozilla Firefox

Einstellungen zur Gestaltung des Skripts

Tiefe der Darstellung (0 = "wie gewählt")

vereinfacht (0 = "nirgend")

0 1 2 3 4 5 6 7 8 9

0 1 2 3

Beispiele

Beweise

Randnotizen

Schwerpunkte

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Einleitung

Kapitelüberschriften

Aufgaben-Info

Ausgabeformat PS

Ausgabeformat PDF

Stoff zurücksetzen

Aufgaben zurücksetzen

Standardeinstellungen

Fertig