

Mathematical Methods for CG

Introduction

Christian Lessig

Formalities

- Lectures: Tuesdays, 13:00 - 15:00
- Tutorials: Tuesdays, 13:00 - 15:00
- Course homepage: <http://isgwww.cs.uni-magdeburg.de/graphics/teaching/2017/cgtools/index.html>

Motto

“It is through science that we prove,
but through intuition that we discover.”

Henry Poincaré

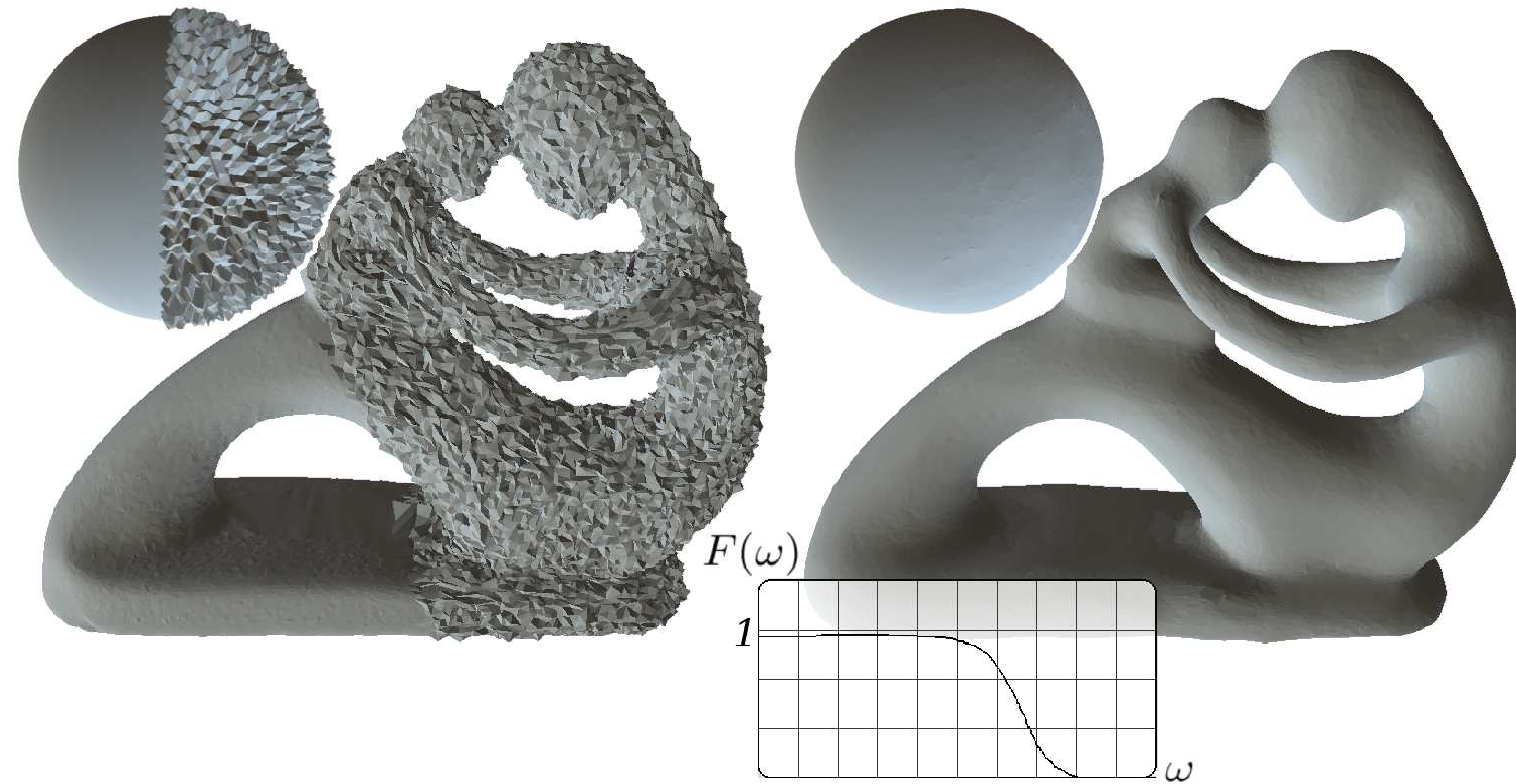
Objectives

Systematically develop some of the tools and techniques commonly used in computer graphics (and vision, machine learning, ...)

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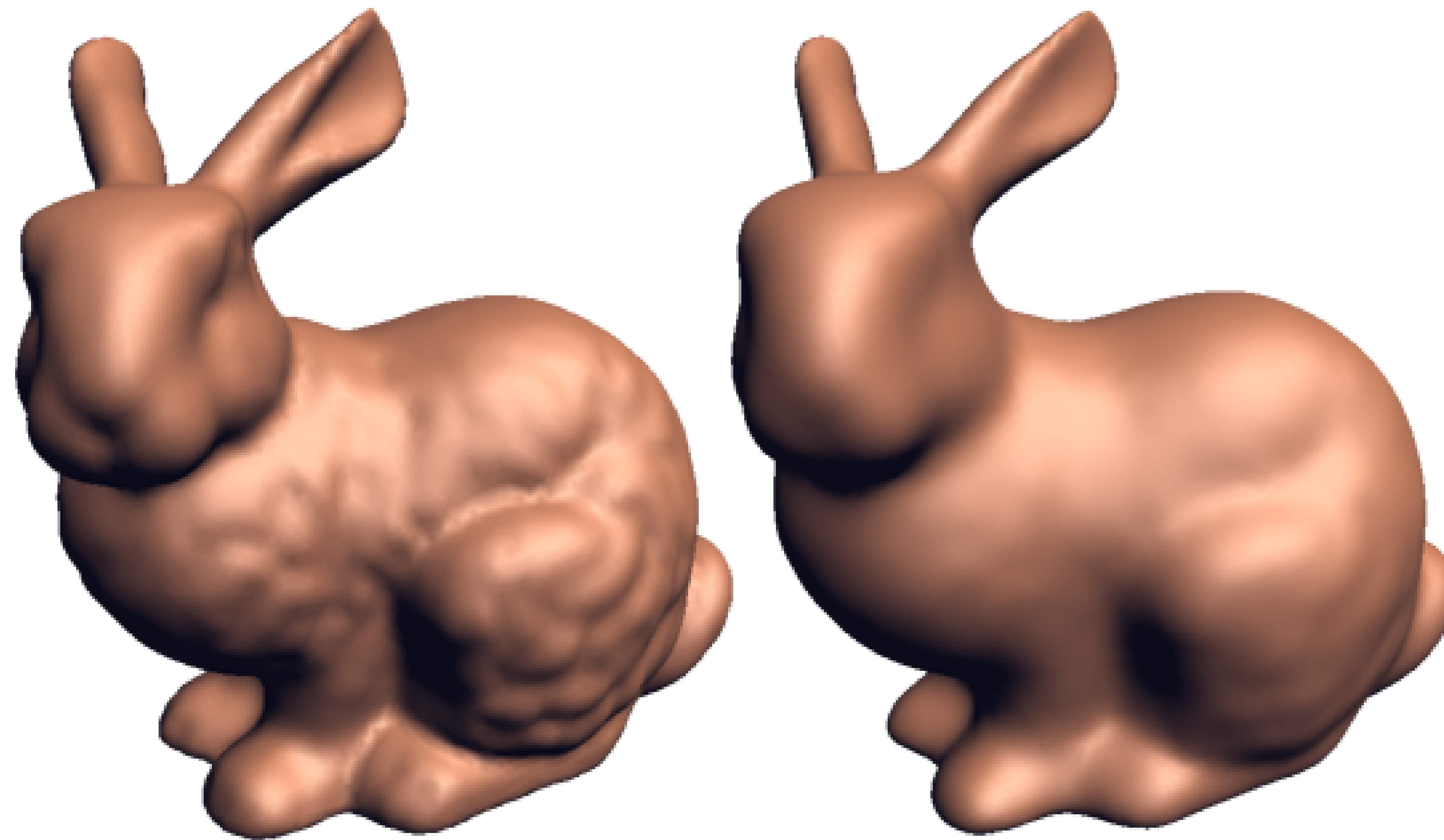
- Why is linear algebra so important for numerics?
- How can we work with continuous functions on a (discrete?) computer?
- How can we develop mathematical models?
- When is a numerical technique “good”?

Objectives



B. Vallet and B. Lévy, "Spectral Geometry Processing with Manifold Harmonics," *Comput. Graph. Forum (Proceedings EGSR 2008)*, vol. 27, no. 2, pp. 251–260, Apr. 2008.

Objectives



<https://www.cs.cmu.edu/~kmcrane/Projects/DGPDEC/paper.pdf>

What this course is not about

programming

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applications
(games, movies)

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numerical linear
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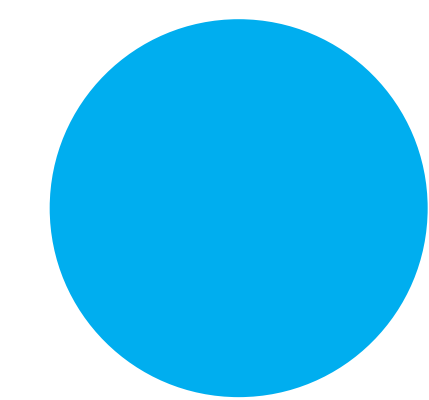
proofs, theorems

numerical linear
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Assignments

- Bi-weekly (or so)
- Theory and programming part
- Sufficient performance in assignments required for exam admittance

Programming

- Python 3.X with Numpy library
- We strongly recommend the Anaconda python distribution which collects all relevant packages: <https://www.continuum.io/downloads>

Literature

- G. Strang, Introduction to Linear Algebra, fifth ed., Wellesley Cambridge Press, 2009.
- G. Strang, Linear Algebra and Its Applications, Thomson, Brooks/Cole, 2006.