

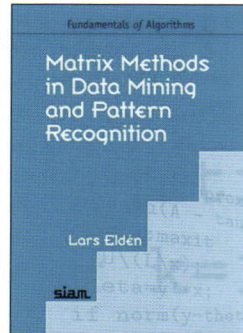
# Matrix Methods in Data Mining and Pattern Recognition

Lars Eldén

SIAM 2007, 230 PAGES

PRICE (PAPERBACK) £45.00 ISBN 978-0-898-71626-9

**T**his book is one of the SIAM series on fundamentals of algorithms. The books are reasonably priced for individual use by students, applied mathematicians, engineers and scientists. The aim of the series is to enable the reader to choose, implement and understand the limitations of an appropriate computational method for tackling a given application. In this case the primary application is that of data mining. The majority of the book is devoted to matrix techniques going through LU, QR and singular value decompositions, least squares models and extensions to tensors. In keeping with the aim of the series, throughout the text MATLAB pseudocode is introduced to illustrate how an algorithm for the decompositions could be implemented. The author facilitates the understanding



of these algorithms by using some unusually helpful diagrams to illustrate the vector and matrix manipulations involved.

In the second part of the book the use of these techniques is illustrated through the examples of classification of handwritten digits, text mining, webpage ranking, key word extraction and face recognition. It might have broadened the appeal of the book if there had been an example from gene microarray or neuroimaging data, but the examples chosen by the author are undoubtedly the most important. In the recent novel *Six Suspects* (2008) by Vikas Swarup (the author of *Slumdog Millionaire*) the Google page rank algorithm crops up, so it is something a mathematician might well be called upon to explain at home or at an interview. Each of the examples given by the author has an established database associated with it that can be downloaded via the web, so this part of the book forms an excellent basis for project-based learning. A selection of exercises and a short list of errata are also available via the publisher's website.

In summary, this book is a clear, MATLAB-based introduction to matrix methods in data mining, but it also contains a considerable amount of material on numerical analysis that I did not expect from the title. In retrospect this is not unexpected given that the author is a professor of numerical analysis. □

Richard Clement CMath MIMA, CSci

## Conference Diary

### Fluid Problems in Process Engineering

This conference will take place from **6 - 8 September 2010** at Devonshire Hall, University of Leeds.

Fluid flows are important in a wide range of engineering applications. Many industrially motivated flow problems lead to fascinating fundamental fluid mechanics studies, as well as providing profound challenges that drive the development of more powerful mathematical and simulation techniques. Understanding and predicting fluid behaviour is becoming increasingly important, especially for applications where experimentation is too difficult, expensive or hazardous. This conference seeks to bring together academics and practitioners to explore the fundamental science, progress and challenges in mathematical modelling and simulation technology inspired by fluid problems in process engineering.

**Invited Speakers:** Professor Kai Sundmacher (Managing Director, Max Planck Institute for Dynamics of Complex Technical Systems, Germany), Professor Donald Schwendeman (Rensselaer Polytechnic Institute, USA).

**Organising Committee:** Chair: Mark Wilson (University of Leeds), Martin Braithwaite (Imperial College London), John Brindley (University of Leeds), Stephen Decent (University of Birmingham), Michael Fairweather (University of Leeds), Andy McIntosh (University of Leeds), Gary Sharpe (University of Leeds).

For scientific queries please contact Dr. Mark Wilson, [m.wilson@leeds.ac.uk](mailto:m.wilson@leeds.ac.uk) For general conference queries please contact Lizzi Lake, Conference Officer, IMA, [lizzi.lake@ima.org.uk](mailto:lizzi.lake@ima.org.uk)

### 2nd Numerical Linear Algebra and Optimisation

This conference will take place from **13 - 15 September 2010** at the University of Birmingham.

**Scope:** The success of modern codes for large-scale optimisation is heavily dependent on the use of effective tools of numerical linear algebra. On the other hand, many problems in numerical linear algebra lead to linear, nonlinear or semidefinite optimisation problems. The purpose of the conference is to bring together researchers from both communities and to find and communicate points and topics of common interest.

**Conference topics** include any subject that could be of interest to both communities, such as: Direct and iterative methods for large sparse linear systems; Eigenvalue computation and optimisation; Large-scale nonlinear and semidefinite programming; Effect of round-off errors, stopping criteria, embedded iterative procedures; Optimisation issues for matrix polynomials; Fast matrix computations; Compressed/sparse sensing; PDE-constrained optimisation; Applications and real time optimisation.