

# Call for papers

## Total Least Squares and Errors-in-Variables Modeling

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### Scope

The total least squares (TLS) method is a numerical linear algebra tool for solving approximately overdetermined systems of equations  $Ax = b$ , where both the vector  $b$  as well as the matrix  $A$  are assumed perturbed. Since its definition by Golub and Van Loan in 1980, the classical TLS method has been extended to solve weighted, structured, and regularized TLS problems and was applied in signal processing, system identification, computer vision, document retrieval, computer algebra, and other fields.

Errors-in-variables models, also known as measurement error models, are an alternative to the classical regression model in statistics when both the dependent as well as the independent variables are subject to errors. Errors-in-variables models are closely related to TLS methods and provide statistical justification for the deterministic approximation criteria used in the numerical linear algebra literature.

In this special issue, we are aiming at the synergy of statistics and computations that provides better computational methods for statistically meaningful estimators, as well as new applications of the TLS techniques and EIV models.

### Relevant topics

**Concepts and Properties :** structured and weighted TLS, other norms, misfit versus latency errors, Bayesian estimation, nonlinear measurement error models, dynamic errors-in-variables, hypersurface fitting, statistical, numerical, robustness and optimization aspects

**Algorithms :** real-time, adaptive, recursive, neural, iterative algorithms, based on SVD or related matrix/tensor decompositions, architectures, complexity, accuracy, regularization, convergence, lower rank approximations

**Applications :** array signal and image processing, filtering, system identification, computer vision, document retrieval, spectral analysis, harmonic retrieval, direction finding, signal/image blind deconvolution/deblurring, biomedicine

## Schedule and submission guidelines

- Deadline for manuscript submission: October 1, 2006
- Notification of acceptance: April 1, 2007
- Publication: October 1, 2007

Please submit articles via the online submission page,

<http://ees.elsevier.com/sigpro>

selecting “TLS and EIV modeling” as the Article Type. Prepare articles following the instructions in the Guide for Authors, available from

<http://authors.elsevier.com/journal/sigpro>

## Guest editors

- Prof. S. Van Huffel, K.U.Leuven, Dept. Elektrotechniek (ESAT), Kasteelpark Arenberg 10, B-3001 Leuven, Belgium
- Dr. I. Markovsky, K.U.Leuven, Dept. Elektrotechniek (ESAT), Kasteelpark Arenberg 10, B-3001 Leuven, Belgium
- Prof. R. Vaccaro, Department of Electrical & Computer Engineering, University of Rhode Island, 4 East Alumni Ave. Kingston, RI 02881, USA
- Prof. Torsten Söderström, Information Technology, Department of Systems and Control, Uppsala University, P O Box 337, SE-751 05, Uppsala, Sweden

**Sabine Van Huffel** received the MD in computer science engineering in June 1981, the MD in Biomedical engineering in July 1985 and the Ph.D in electrical engineering in June 1987, all from K.U.Leuven, Belgium. She is full professor at the department of Electrical Engineering from the Katholieke Universiteit Leuven, Leuven, Belgium. Her research interests are in numerical (multi)linear algebra, numerical software, errors-in-variables regression, system identification, parameter estimation and biomedical data processing (linear and nonlinear signal analysis and classification). Special attention is given to the numerical aspects and to the design of reliable algorithms and their practical evaluation in medical diagnostics.

She is author of a book entitled “The Total Least Squares Problem: Computational Aspects and Analysis” (SIAM, Philadelphia, 1991), coauthor of the book entitled “Exact and Approximate Modeling of Linear Systems: A Behavioral Approach” (SIAM, Philadelphia, 2006), editor of 2 books (SIAM, 1997 and Kluwer 2002) and 3 special issues (NMR in Biomedicine, Lin. Alg. Appl., Numer. Lin. Alg. Appl.). In addition, she has authored and co-authored 150 papers in International Journals, 4 book chapters, and more than 140 conference contributions.

**Ivan Markovsky** obtained MS degree in Control and Systems Engineering in 1998 from the Technical University of Sofia and PhD degree in Electrical Engineering in 2005 from K.U.Leuven. Since February 2005 he is a postdoctoral research in the Electrical Engineering department of K.U.Leuven. His current research work is focused on identification methods in the behavioral setting and errors-in-variables estimation problems. He is an author of the book “Exact and Approximate Modeling of Linear Systems: A Behavioral Approach” (SIAM, Philadelphia, 2006).

**Richard J. Vaccaro** received the B.S. and M.S. degrees from Drexel University in 1979 and the Ph.D. degree from Princeton University in 1983, all in electrical engineering. Since 1983, he has been on the faculty of the Department of Electrical Engineering, University of Rhode Island. He was the Department Chair from 1999-2004. From 1995-1998 he was Chair of the Underwater Acoustic Signal Processing Technical Committee of the IEEE Signal Processing Society, and helped form the Sensor Array and Multichannel Signal Processing Technical Committee in 1999. His research interests include direction-of-arrival estimation using sensor arrays; underwater acoustic signal processing; multipath time-delay estimation; passive and active sonar signal processing; subspace methods for parameter estimation and signal modeling.

**Torsten Söderström** was born in Malmö, Sweden, in 1945. He received his MSc degree "civilingenjör" in engineering physics in 1969 and his PhD in automatic control in 1973, both from Lund Institute of Technology, Lund, Sweden. He is a Fellow of IEEE.

During the period 1967–1974 he held various teaching positions at the Lund Institute of Technology. Since 1974, he has been at Uppsala University, Uppsala, Sweden, where he is a professor of automatic control. During 1975–1998 he was the head of the Systems and Control Group, which now is a part of Department of Information Technology.

Dr Söderström is the author or co-author of many technical papers. His main research interests are in the fields of system identification, signal processing, and control of mechanical systems. He is the author or co-author of four books: “Theory and Practice of Recursive Identification”, MIT Press, 1983 (with L Ljung), “The Instrumental Variable Methods for System Identification”, Springer Verlag, 1983 (with P Stoica), “System Identification”, Prentice-Hall, 1989 (with P Stoica) and “Discrete-time Stochastic Systems”, Prentice-Hall, 1994; 2nd edition, Springer-Verlag, 2002. In 1981 he was given (along with his co-authors) an Automatica Paper Prize Award. He is an Automatica editor for the area of System Parameter Estimation since 1992.

He has held a number of positions within IFAC, International Federation of Automatic Control, during 1993–2002. He is currently a council member of EUCA, European Union Control Association.