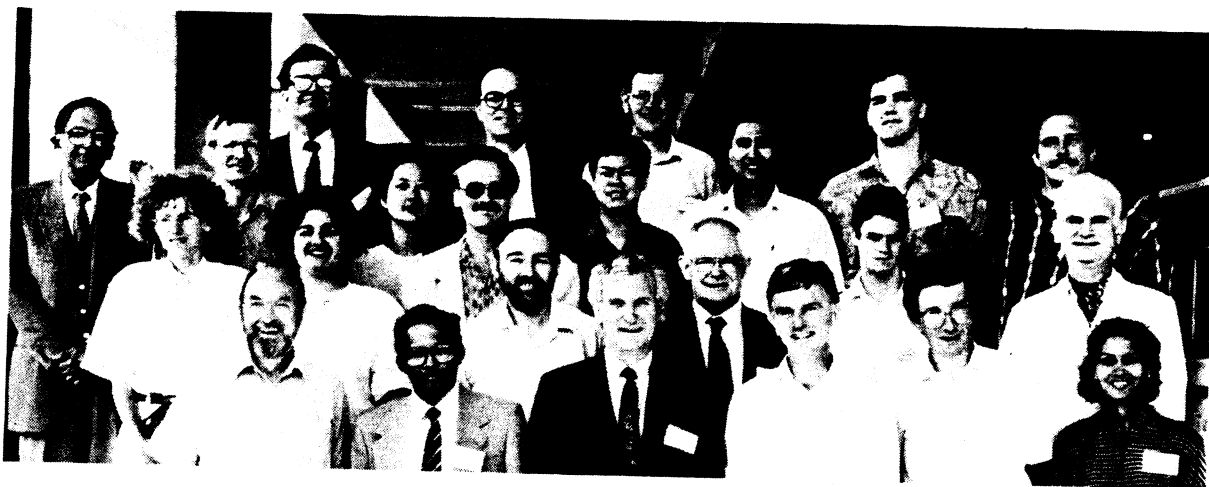


REPORTS ON CONFERENCES ATTENDED



Auckland Matrix Workshop

Back two rows (left to right): A. R. Sen, George Seber, Jon Stene, Siew Choo Soo, Simo Puntanen, Peter Clifford, Thomas Yee, John Maindonald, Antony Gomez, Alain Vandal, Ron Christensen
Front two rows: Renate Meyer, Alastair Scott, Snehalata Huzurbazar, Thomas Mathew, Andrew Gilmour, Jeffrey Hunter, Shaytle Searle, Graham Wood, John Thompson, Bill Farebrother, George Styan, Gita Mishra.
Other participants included: John Chipman, Harold Henderson, Richard Jarrett, Chris Paige, Michael Schimek, Garry Tee, and David Vere-Jones.

International IMS-ILAS Workshop on Matrix Methods for Statistics

Report by George Styan

Co-sponsored by the Institute of Mathematical Statistics (IMS) and the International Linear Algebra Society (ILAS), an International Workshop on Matrix Methods for Statistics was held at the University of Auckland in Auckland, New Zealand, Friday-Saturday 4-5 December 1992. This Workshop was organized by Harold V. Henderson, Jeffrey J. Hunter, Bryan F. J. Manly, Simo Puntanen, Alastair J. Scott, and George P. H. Styan. Participants came from Australia, Austria, Canada, Denmark, Finland, Germany, New Zealand, the United Kingdom, and the United States.

The Workshop began with a talk by John S. Chipman (University of Minnesota) on "The Generalized matrix Schwarz inequality and its application to biased estimation in linear regression". This was followed by George P. H. Styan (McGill University, Montreal) speaking on "The efficiency of a linear unbiased estimator and on a matrix version of the Cauchy-Schwarz inequality"; it was observed that Styan's results complemented those published by Chipman (1976) in *Generalized Inverses and Applications* (M. Z. Nashed, ed., Academic Press, 549-769). This first session ended with the presentation by Simo Puntanen (University of Tampere) on "Matrix tricks related to deleting an observation in the general linear model".

The afternoon sessions on the Friday started with a talk by Garry J. Tee (University of Auckland) on Alexander Craig Aitken: Garry's plans for publication of Aitken's Collected Papers were also discussed. Richard William Farebrother (University of Manchester) spoke about statistical contributions to matrix methods in an historical context, while Peter Clifford (Oxford University) spoke on "The distribution of Pearson's correlation coefficient in the presence of spatial autocorrelation" and David J. Vere-Jones (Victoria University of Wellington) spoke on "Generalized permanents and their applications to multivariate negative binomial distributions".

These talks were followed by a reception featuring Bluff oysters (courtesy Peter Mullins) and an excellent dinner in Berlin (organized by Alan Lee).

The sessions on the Saturday started with Graham R. Wood (University of Canterbury, Christchurch) telling us "How not to use matrices when teaching statistics" (joint work with David J. Saville, New Zealand Pastoral Agriculture Research Institute Ltd., Lincoln). This was followed by Thomas Mathew (University of Maryland, Baltimore-County) speaking on "Combining independent tests for a common mean: an application of the parallel sum of matrices" and by an in-depth study by Renate Meyer (Technical University of Aachen) on "Invariant preorderings of matrices and approximation problems in multivariate statistics and multidimensional scaling". Shayle R. Searle (Cornell University, Ithaca, New York) presented "Further results and proofs for the singular linear model", while Michael G. Schimek (University of Graz Medical Schools) told us about "Problems with direct solutions of the normal equations for nonparametric models".

The Saturday afternoon session started with a tour de force by Chris C. Paige (McGill University, Montreal) on "The full CS-decomposition of a partitioned orthogonal matrix" (joint work with Musheng Wei, East China Normal University, Shanghai). The CS (cosine/sine)-decomposition (CSD) of a 2-block by 2-block partitioned unitary matrix reveals the relationships between the singular-value decompositions of each of its 4 sub-blocks. The CSD was originally proposed by C. Davis and W. Kahan, and is important in finding the principal angles between subspaces (Davis and Kahan, Björck and Golub), such as in computing canonical correlations between two sets of variates. It also arises in, for example, the Total Least Squares problem.

The Workshop ended with talks by Jeffrey J. Hunter (Massey University, Palmerston North) on the "Stationary distributions and mean first passage times in Markov chains using generalized inverses" and by Alastair J. Scott (University of Auckland) "Characterizing invariant convex functions of matrices" (joint work with James V. Bondar, Carleton University, Ottawa).

New-Delhi Workshop on Generalized Inverses

Report by Bob Hartwig

From December 11-16 the Indian Statistical Institute in New-Delhi, hosted a very successful workshop on Generalized Inverses. Close to fifty participants attended, coming from such far away countries as India, the U.S., Canada, Germany, Japan, China, Finland, Ukraine and Singapore.

The topics presented in the workshop illustrated the wide scope of research within the field of g -inverses. Indeed they ranged from Classical Linear Algebra papers to Linear Programming, Banach Algebras, Signal Processing, Linear Models, Total Least Squares, Ring Theory, Prediction and Estimation Theory and Semigroups.

The workshop was well balanced in that no one area dominated the meeting. Moreover the various research areas well complemented each other and allowed for useful "cross-fertilization" of ideas. This was illustrated, for example, by the fact that the concept of "volume" made its simultaneous entry in at least three research areas. After decades of neglect, Moore's original formulae for his inverse and the related concept of volume, now turn out to be indispensable in such fields as MP-inverses over rings, g -inverses in Banach Algebra and the study of Affine Mappings in Linear Programming as initiated by Karmarkar. Without g -inverses some of these results would not have been possible. This workshop should perhaps be remembered as Moore's "vindication."

Three popular short courses were given on Toeplitz matrices and iterative least squares, on Matrix Partial orders and on the Extended matrix Schwarz inequality with applications to Least Squares and Econometrics.

A round-table discussion was held discussing the future of Generalized Inverses and the consensus that emerged will be published elsewhere. The workshop was concluded with a successful open problem session, where many questions and ideas were floated. It was a great opportunity for many of us to meet some of the people behind familiar name tags.

The host institute did a wonderful job, and apart from a postponed trip to the Taj Mahal, all went very well.