

# IMAGE

## The Bulletin of the International Matrix Group serving The International Linear Algebra Community

Volume 1, Number 1

Free to IMG members

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### An announcement

### Editorial

We are pleased to announce the establishment of IMG/TILAC-the International Matrix Group/The International Linear Algebra Community. IMG was constituted during the recent Combinatorial Matrix Analysis Conference in Victoria (Canada), May, 1987. The general goal of IMG is to encourage activity in linear algebra.

A more specific aim is to support groups and individuals active in organizing meetings or publications in all aspects of linear algebra. We have no intention of supplanting or competing with existing organizations, our entire purpose is international coordination, to assist the development of linear algebra. We may add new activities where and when desirable. We welcome activities in all applications of linear algebra and we desire a proper share for theoretical matrix analysis and abstract linear algebra.

We plan the following.

1. IMG will initiate, encourage and coordinate linear algebra meetings, and support them by the means available, such as information delivery and (eventually) the solicitation of financial support.

2. IMG will edit and distribute a bulletin (named IMAGE) to serve as a stage for discussions and opinions. It will contain essays related to linear algebra, as well as information about various activities, including publicity about future meetings, about new papers accepted by the linear algebra journals, about recently written theses, and about individuals (new positions, sabbaticals, leaves, etc.) It may contain letters to the editor or signed columns of opinion.

3. IMG will maintain an electronic mail service, IMG-NET. We will transmit announcements of IMG activities and circulate other notices of interest to linear algebraists.

Membership in IMG is open to all mathematicians interested in furthering its aims or participating in its activities. Initially there will be no cost to individuals, and we hope that costs will always be low.

The group now has the following structure:

Officers:	Chairman	- Hans Schneider
	Editor of IMAGE (The IMG Bulletin)	- Robert C. Thompson
	Secretary	- Daniel Hershkowitz
Committee members:	Richard A. Brualdi, David H. Carlson, Charles R. Johnson	

A key feature is an international board consisting of a representative from each of several countries, and an at large representative. Initially the board consists of:

Belgium	- P. Van Dooren	Ireland	- T. Laffey
Canada	- P. Lancaster	Israel	- A. Berman
Czechoslovakia	- M. Fiedler	Japan	- T. Ando
Germany	- L. Elsner	Netherlands	- H. Bart
Great Britain	- S. Barnett	Portugal	- G. N. de Oliveira

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Greece	- J. Maroulas	Spain	- V. Hernandez
Hong Kong	- Y. Au-Yeung	United States	- G. Golub
Hungary	- P. Rosza	At large	- B. Datta

As an initial step we are consulting the members of the international board to identify useful support that we can give to linear algebra activities. If you have any suggestions please communicate with your national representative or with any of the undersigned officers. Contributions for **IMAGE** are invited and should be sent to Bob Thompson, at Santa Barbara. If you wish to contribute an announcement for circulation on **IMG-NET**, please contact Danny Hershkowitz, at the Technion, Haifa. If you wish to be placed on the mailing list to receive **IMAGE**, please return the coupon on page 8, or otherwise contact Bob Thompson. To get on **IMG-NET**, please contact Danny Hershkowitz.

D. Hershkowitz	H. Schneider	R. C. Thompson
Mathematics	Mathematics	Mathematics
Technion	University of Wisconsin	University of California
Haifa 32000, ISRAEL	Madison, WI 53706, USA	Santa Barbara, CA 93106, USA

E-Mail addresses:	Hershkowitz: mar23aa@technion.bitnet
	Schneider: hs@vanvleck.math.wisc.edu
	Thompson: thompson@henri.ucsb.edu
	Brualdi: brualdi@vanvleck.math.wisc.edu
	Carlson: sdsulcarlson@sdcs.vax.ucsd.edu
	Johnson: #crjoh2@wmmvs.bitnet

News**Valencia linear algebra meeting successful**

The most recent in a series of linear algebra meetings in Iberia was held at Valencia, Spain, September 28-30, 1987. The meeting was well attended, with participants from many corners of the world, reflecting the increasingly prominent stature of this series of conferences. Most addresses were in English, but some adopted a format in which the screen display was in English but the spoken address in another language. Major addresses were delivered by C. W. Gear, G. Golub, C. R. Johnson, H. Schneider, and T. Kailath. Two important scheduled participants, I. Gohberg and L. Rodman, could not attend and their planned addresses were not given. A noteworthy aspect was the impressively strong group of young linear algebraists from Spain and Portugal presenting papers. Summary: a productive meeting.

News**Santa Barbara linear algebra conference held**

An annual regional linear algebra conference has been established in southern California. The first meeting was at San Diego State University, in November, 1986, and was organized by S. Pierce. The second meeting was at the University of California at Santa Barbara, November 21, 1987, and was organized by Robert C. Thompson. Principal speakers included R. Grone, R. Guralnick, C. R. Johnson, C. Koc, A. Krieg, C. K. Li, M. Marcus, S. Pierce, B. Tam, O. Taussky-Todd and J. Todd, and S. G. Williamson. Guralnick's talk was on his solution (with L. Levy) of the diagonalization problem (= Smith form diagonalization) for matrices with elements in a noncommutative principal ideal domain. There was an interesting interplay between this talk and that of A. Krieg (on Hecke algebras) in that the rank one case, presumably the easiest case but in fact the only one in which the full diagonalization theorem is false, is genuinely exceptional in that only it

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corresponds to a noncommutative Hecke algebra. Selecting some other titles for mention here, the Marcus talk was on Bessel's inequality in tensor space and its relation to the permanent on top conjecture, that of Grone on the Laplacian spectrum of a graph, and C. K. Li spoke on unitarily invariant norms and the numerical radius.

Current planning is that this meeting next be held in November or December, 1988, at a site yet to be determined, but probably to be Santa Barbara.

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#### News

### **New title for Marvin Marcus**

Marvin Marcus, who has been a faculty member at the University of California at Santa Barbara since 1962, has changed his departmental alignment from a joint full professorship in the the Mathematics Department and the Computer Science Department to a full professorship in the Computer Science Department only. His very active research program in linear algebra and in multilinear algebra continues with full vigor, however, and he continues to participate in the editorial supervision of *Linear and Multilinear Algebra*. He also continues his editorial duties with other journals.

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#### News

### **College of William and Mary focuses on matrix theory**

The College of William and Mary, located in Williamsburg, Virginia, USA, has focussed on matrix theory in an impressive way, through the appointments of Charles R. Johnson and Leiba Rodman to faculty positions. Readers will recall that Johnson is the coauthor (with R. Horn) of the books *Matrix analysis* and *Topics in matrix analysis*, and Rodman is coauthor (with I. Gohberg and P. Lancaster) of a series of three volumes: *Matrix polynomials*, *Matrices and indefinite scalar products*, and *Invariant subspaces of matrices with applications*. Ion Zaballa (Vitoria, Spain) and John Maybee (Colorado) will be visitors during the spring, 1988, semester. Johnson's appointment is as Class of 1961 Professor, an endowed chair, and another appointment in the field is anticipated for next year.

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#### News

### **West coast number theory**

The *West coast number theory meeting* is not primarily a matrix theory conference, but since parts of number theory involve matrix theory, quadratic forms being a notable example, some hard linear algebra is always visible at this conference. The conference has a unique structure in that no program is prepared in advance: On the first day an organizational meeting is held to determine when individual contributed papers are to be given, each contributor being allocated the same amount of time. The meeting is held on four days immediately before Christmas each year, the most recent being December 17-21, 1987, at the very scenic Asilomar conference grounds in Pacific Grove, California, USA. The meeting was well attended. The next meeting in this series will be at Las Vegas, Nevada, USA, December, 1988. John Selfridge, now at Northern Illinois University, DeKalb, Illinois 60115, USA, is a major force behind the continuing success of this series of meetings.

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#### News

### **B. and K. Datta in San Diego**

B. N. and K. Datta, both of Northern Illinois University, are spending academic 1987-88 at the University of California, San Diego. B. N. Datta is especially well known to linear algebraists as an organizer or co-organizer of several succesful meetings.

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News**SIAM announces linear algebra prize**

The SIAM Council has approved a linear algebra prize to be given every two years to the author(s) of the best paper in applicable linear algebra published in English in a peer reviewed journal within the award period. The first award is to be made at the third SIAM conference on linear algebra, Madison, Wisconsin, USA, May, 1988, and will recognize significant research contributions with a publication date of 1986 or 1987. The nomination period for the prize was to close at the end of December, 1987.

News**Two January meetings**

Two meetings occurring during January, 1988, are: (1) The fourth *Haifa matrix conference*, January 3-5, at Haifa, Israel, and the special session on *Matrix analysis and applications*, January 6-7, as part of the American Mathematical Society annual meeting, January 6-9, at Atlanta, Georgia, USA. Reports on these meetings should appear in the next issue of IMAGE.

Forthcoming meeting**Dublin meeting**

The fourth Dublin linear algebra conference is planned for March 10 and 11, 1988, at University College, Belfield, Dublin 4, Ireland. The conference organizer is Fergus Gaines, and anyone interested in attending or participating should write him for details at the address just given. The program for the conference has not yet been announced as this is written, the deadline for abstracts being 15 January, 1988.

Forthcoming meeting**Idaho meeting**

The eleventh annual Idaho State University Spring Conference will be held April 28-29, 1988. The subject will be *Applied and computational linear algebra*, with C. R. Johnson (College of William and Mary) and Stephen F. McCormick (University of Colorado, Denver) as invited speakers. Individuals interested in participating should contact Larry Ford, Department of Mathematics, Idaho State University, Pocatello, Idaho 83209, USA. (phone: 208-236-3465 or 3350.) Those interested in contributing a twenty minute talk should provide an abstract by March 31, 1988.

Forthcoming meeting**Third SIAM linear algebra meeting**

The third SIAM applied linear algebra meeting is scheduled for May 23-26, 1988, at the Concourse Hotel, Madison, Wisconsin, USA. This promises to be a well attended event. The deadline for receipt of abstracts of contributed talks closed in early December, 1987. The new SIAM linear algebra prize will be awarded at the meeting, there is to be a short course on statistics by G. Styan, I. Olkin, and D. Bates on the Sunday preceding the meeting, and H. Schneider will be the speaker at the conference banquet. There are eight invited speakers (A. Sameh, J. Alan George, S. Friedland, P. Van Dooren, T. Kailath, V. Klee, A. J. Hoffman, and M. D. Perlman), and the number of contributed papers is expected to exceed 150. There are also to be five minisymposia, organized by R. J. Plemmons, G. Oustroukhov, C. R. Johnson, R. Horn, and G. Cybenko.

The two previous SIAM linear algebra meetings were generally regarded as very successful. This one should be, too. Details should be obtained by contacting the SIAM Conference Coordinator, 117 South 17th Street, 14th Floor, Philadelphia, PA 19103, USA.

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Forthcoming meeting**Johns Hopkins conference**

The mathematics department at Johns Hopkins University, Baltimore, MD, USA, runs a conference early each summer in some aspect of mathematics, not necessarily linear algebra. There will be a conference this year, June 24-28, and its area will be linear algebra. The principal speaker will be R. C. Thompson, and his topic will be *Matrix spectral inequalities*.

Of the eleven previous conferences in the Johns Hopkins series, two were particularly significant for linear algebraists. One was the lecture series given by G. Golub, which ultimately led to the book by Golub and C. Van Loan entitled *Matrix computations*. The other was the sequence of talks by Charles R. Johnson, on *Combinatorial aspects of matrix analysis* and it is expected that a book will eventually emerge encompassing these lectures.

The intent is that the 1988 lectures by Thompson also lead to a book, eventually.

Information concerning the 1988 conference may be obtained by contacting Roger Horn, Department of Mathematics, Johns Hopkins University, Baltimore, MD 21238, USA. His electronic mail address is: msc\_hrah@jhuvms.bitnet. Contributed papers are planned, to receive special consideration for the SIAM journal *Matrix analysis and applications*.

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Forthcoming meeting**Bradford meeting**

A conference on *Applications of matrix theory* is scheduled for July 5-8, 1988, at the University of Bradford, Bradford, West Yorkshire, BD7 1DP, Great Britain. The announced program of principal addresses includes A. George, N. J. Higham, C. R. Johnson, T. J. Laffey, M. J. D. Powell, J. Reid, and D. Limebeer. There is also a program of contributed talks. Anyone interested in attending should write to S. Barnett, Department of Applied Mathematics, University of Bradford, at the address just given.

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Forthcoming meeting**Calgary operator theory conference**

An international conference entitled *Operator theory: advances and applications*, has been announced. This is to be a conference to mark the 60th birthday of I. Gohberg, and it will be held at the University of Calgary, Calgary, Alberta, Canada, August 22-26, 1988. The chairman of the organizing committee is P. Lancaster, at the Department of Mathematics, University of Calgary, 2500 University Drive Northwest, Calgary, Alberta, T2N 1N4, Canada. There is a long list of plenary and invited speakers, and twelve special sessions. There is to be an anniversary volume and conference proceedings. The announced deadline for titles and abstracts of invited and contributed papers is June 15, 1988.

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Journal news**News from *Linear and multilinear algebra***

*Linear and multilinear algebra* has just published the third and fourth issues of volume 21, and newly accepted papers will appear in volume 23. (Four issues comprise one volume.) The journal has no backlog of accepted papers, publication being on the flow system with individual issues transmitted to the printer as soon as they are filled. This means that the waiting time until publication is approximately the referee's time plus printer's time of generally about six months.

At the present time, about eight issues are published in a year. The four issues of volume 22 and the first two issues of volume 23 are presently at the printer.

Besides research papers, *Linear and Multilinear Algebra* publishes research problems in nearly every issue, and book reviews in some issues. Contributions to the

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research problem section are always needed, and usually receive especially rapid evaluation and publication.

A cumulative index of all papers, reviews, research problems, and other items appearing in the first twenty one volumes (84 issues) is being prepared, and will be published as soon as it is finished.

Manuscripts for *Linear and Multilinear Algebra* should be submitted (in triplicate, please) to Marvin Marcus, Department of Computer Science, or to Robert C. Thompson, Department of Mathematics, University of California, Santa Barbara, CA 93106, USA. Manuscripts may also be submitted to any editorial board member.

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#### Journal news

#### **News from *Linear algebra and its applications***

Volume 100 of *Linear algebra and its applications* will be an index volume. It will contain the author index for papers published in the first 100 volumes of the journal. It is also planned to include a list of all members of the editorial board since the inception of the journal and, to the extent possible, a list of all referees. A complete listing of special issues with their special editors and of profiles (biographical articles) and obituaries will also be included.

Special issues of *Linear algebra and its applications* currently accepting manuscripts are (with editors and closing deadlines for submissions):

In honor of Alan J. Hoffman on his 65th birthday, edited by R. F. Bixby, U. G. Rothblum, and A. Schrijver, deadline December 31, 1987;

Proceedings of the Valencia conference on linear algebra, edited by M. Neumann, G. N. de Oliveira, and V. Hernandez, deadline December 31, 1987;

Proceedings of the fourth Haifa matrix conference, edited by A. Berman, D. Hershkowitz, and L. Lerer, deadline April 30, 1988;

Linear systems and control, edited by P. Fuhrmann, H. Kimura, and J. C. Willems, deadline May 31, 1988;

Linear algebra and statistics, edited by M. D. Perlman, F. Pukelsheim, and G. P. Styan, deadline September 30, 1988;

Linear algebra in image reconstruction from projections, edited by Y. Censor, T. Elfving, and G. T. Herman, deadline November 30, 1988.

A list of current special issues will henceforth appear in each regular issue of *Linear algebra and its applications*, beginning with volume 99.

Manuscripts for *Linear algebra and its applications* not intended for a special issue may be submitted to Richard Brualdi or Hans Schneider, Department of Mathematics, University of Wisconsin, Madison, WI 53706, USA. Manuscripts may also be submitted to any editorial board member. Manuscripts should be submitted in triplicate, please.

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#### Journal news

#### **New SIAM linear algebra journal announced**

SIAM, the Society for Industrial and Applied Mathematics, has announced the publication to begin early in 1988 of its linear algebra journal *Matrix analysis and applications*. The journal will contain research articles on matrix theory and applications, including innovative numerical methods, in such areas as Markov chains, networks, signal processing, systems and control theory, mathematical programming, economics and biological modeling, and statistics and operations research. The managing editor is G. Golub, and R. J. Plemmons is the associate managing editor. There is also an editorial board. Manuscripts, however, should be submitted in triplicate to SIAM, Box 7541, Philadelphia, PA 19101, USA.

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Letter to the editor

Editor, **IMAGE**:

I write this letter to **IMAGE** in my capacity as a professional linear algebraist in order to raise an issue that is outside my capacity to raise as the **IMAGE** editor. I hope that this letter will establish a format for letters to the editor, and at the same time will generate comment from readers, perhaps as letters to the editor.

The founders of the International Matrix Group are very hopeful that this organization will contribute to the vitality of linear algebra in a significant way. Two major roles of **IMG** will be the maintenance of **IMG-NET**, the electronic news service for linear algebra, and the publication of **IMAGE**, the quarterly news letter. However, a third major activity is needed: a significant linear algebra conference to be designated as the **IMG** meeting.

The points at issue here are these:

(a) In view of the rather large number of recent conferences on various aspects of linear algebra, is yet another meeting needed?

(b) If it is needed, where should it be held?

(c) How often should it be held?

(d) What structure should it have? (Examples: many contributed talks, or a few contributed talks with a large selection of invited addresses, or a focus on some special aspect of linear algebra, with a different focus for each **IMG** meeting, or other? How financed?)

(e) Should it be located in a low cost environment, such as a university, or a high cost one, such as a major hotel or resort?

My opinion is that (a) has a "yes" answer, (b) calls for a site usually outside the United States, and (e) should be the low cost option. I have not yet formed an opinion concerning (c) and (d).

What do you think? Comments on this, or any other, topic are solicited.

Robert C. Thompson  
Santa Barbara

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Late news

### New international board member

As this issue closed for printing, A. Bjorck, of Sweden, joined the **IMG** International Board, adding to the list of Board members on pages 1 and 2.

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Reader response

### Reply Coupons

We constructed a mailing list for this first issue of **IMAGE** ourselves, locating many names. If you did not receive a copy of **IMAGE** addressed to you, then we failed to locate yours. In this event, if you wish to receive **IMAGE** regularly, please fill in and return the first coupon on the next page. If, on the other hand, you received an issue of **IMAGE** and do not wish to receive more, then use the reply coupon or electronic mail to transmit that message.

If you have access to electronic mail (for example, **BITNET**), and wish to be added to **IMG-NET**, then please communicate with Danny Hershkowitz electronically, at the address on page 2, or fill in and return the second coupon on the next page.

Please note: To get **IMAGE** and be on **IMG-NET**, you need to do two steps, one for each action.

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**Reply coupon for IMAGE**

R. C. Thompson  
Mathematics  
University of California  
Santa Barbara, CA 93106, USA

Dear Bob:

Please add me to the **IMAGE** mailing list, as follows.

Name: \_\_\_\_\_

Mailing address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please also tell us your professional title, if you have one: \_\_\_\_\_

(Cut here)

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**Reply coupon for IMG-NET**

D. Hershkowitz  
Mathematics  
Technion, Israel Institute of Technology  
Haifa 32000, Israel.

Dear Danny:

Please add me to **IMG-NET**. My name, location, and electronic address, are:

Name: \_\_\_\_\_

Location: \_\_\_\_\_

Electronic address: \_\_\_\_\_  
\_\_\_\_\_  
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Your comments on this first issue  
of **IMAGE** are solicited.

This issue of **IMAGE** was prepared at the University of California at Santa Barbara.