MATSCIENCE

INSTITUTE OF MATHEMATICAL SCIENCES
MADRAS, INDIA

SEVENTEENTH ANNIVERSARY

ANNUAL REPORT 1978

The Institute of Mathematical Sciences
Madras

"The pursuit of science is at its best
when it is a part of a way of life"

Annual Report 1978

Patron :

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Hon'ble Mr. C. Aranganayakam, M.A., B.L.,
Minister for Education, Government of Tamil Nadu

Director :

Professor Alladi Ramakrishnan

Board of Governors

1. Hon'ble Mr. C. Aranganayakam, M.A., B.L. Minister for Education Government of Tamil Nadu Madras.	Chairman
2. Mr. C. G. Rangabashyam, I.A.S. Secretary to Government Education Department Government of Tamil Nadu Madras.	Member
3. Mr. T. Sethumadhavan Dy. Secretary to Government of India Department of Atomic Energy Bombay.	Member
4. Dr. P. K. Iyengar Director Physics Group Bhabha Atomic Research Centre Bombay.	Member
5. Professor Alladi Ramakrishnan Director The Institute of Mathematical Sciences Madras.	Member
6. Professor N. R. Ranganathan The Institute of Mathematical Sciences Madras.	Member

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1. Mr C. G. Rangabashyam, I.A.S.
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2. Mr. K. Venkatesan, I.A.S.
   Secretary to Government
   Finance Department
   Government of Tamil Nadu, Madras.

3. Mr. T. Sethumadhavan
   Dy Secretary to Government of India
   Department of Atomic Energy,
   Bombay.

4. Professor Alladi Ramakrishnan
   Director
   The Institute of
   Mathematical Sciences, Madras.

Academic Council

CHAIRMAN

Professor Alladi Ramakrishnan
Director

MEMBERS

Professor R. Vasudevan
Professor K. R. Unni
Professor N. R. Ranganathan
Professor T. S. Santhanam
Dr. V. Radhakrishnan
Dr. K. H. Mariwalla
Dr. K. Srinivasa Rao

General Information

Aims and Objects

1. To create and provide an atmosphere and environment suitable for creative work and the pursuit of knowledge and advanced learning in the mathematical sciences for their own sake.

2. To promote and conduct research and original investigation of fundamental sciences in general with particular emphasis on Mathematics, Applied Mathematics, Theoretical Physics and Astrophysics.

3. To foster a rigorous mathematical discipline, to stimulate a zest for creative work and cultivate a spirit of intellectual collaboration among academic workers in pure and applied branches of science.

4. To arrange lectures, meetings, seminars and symposia in pursuance of its academic work for the diffusion of scientific knowledge.

5. To invite scientists in India and abroad actively engaged in creative work to deliver lectures and participate in academic activity

Academic Activities

The primary activity of the Institute is creative research in Mathematical Sciences. In pursuit of the objectives of the Institute, weekly seminars as well as series of lectures on various topics of interest, both by visiting scientists and academic staff of the Institute are held.

To commemorate the inauguration of the Institute an anniversary Symposium is held in January for which scientists from India and abroad are invited to deliver one hour addresses summarising their original work on recent advances in various branches of Mathematical Sciences.

Academic Staff

The Academic Staff consists of Senior Professors, Professors, Associate Professors Assistant Professors, Visiting Professors, Visiting Scientists, and Research Fellows.

Ph.D. Programme

Facilities are available for postgraduate students to work for Ph.D. degree under the guidance of the academic staff of the Institute in various faculties. Senior and Junior research fellowships are awarded by the Institute.

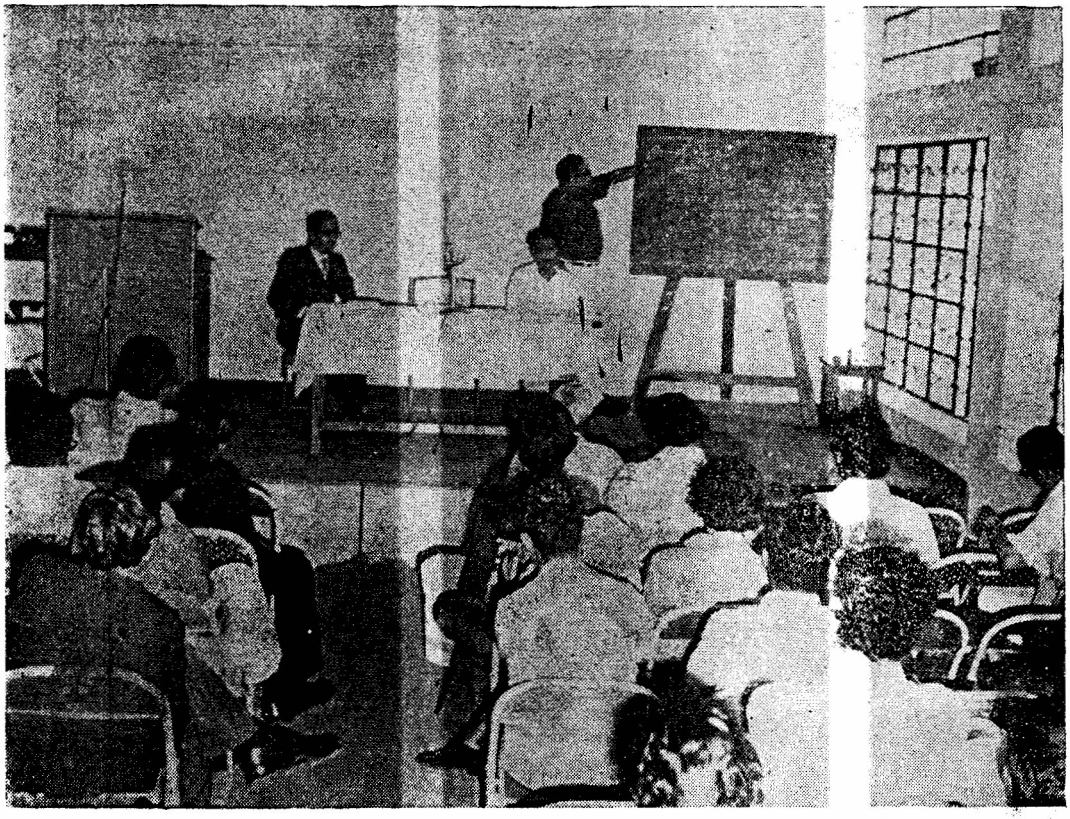
The Standing Committee of the Inter-University Board of India and Ceylon at its meeting held in February 28, 1967 adopted a resolution recognising the Institute as a suitable centre for research work. In view of the above resolution the Institute is now recognised by the various Indian Universities as a centre for research or the doctorate degree in Theoretical Physics and Mathematics.

Publications

1. RESEARCH PAPERS (Preprints and reprints are available on request).

2. MATSCIENCE REPORTS based on the lecture courses delivered at the Institute both by visiting scientists and academic staff (Price Rs. 10/-within India or U. S. $ 2-00 outside). PROCEEDINGS OF THE SEMINARS AND CONFERENCES conducted by the Institute are also published as special Matscience Reports.

Conference on Structure of Matter, Mysore (February 1978).



Conference on Mathematical Methods, Mysore (August 78).

News of the I tute

Sixteenth Anniversary

The sixteenth anniversary of the institute s celebrated on the 9th January 1978. Professor Alladi Ramakrishnan inaugu ed the sixteenth anniversary symposium entitled "New particles—do they ıply new physics?" and was conducted for four days.

In his inaugural address Professor Ramak ınan described new facets and new concepts in the special theory of relativi Professors N. B. Backhouse (University of Liverpool, UK), N. Mukunda (Cer for Theoretical Studies, Indian Institute of Science, Bangalore), G. Rajasekaran '. M. Mathews (both from the University of Madras), P. Achutan (I. I. T. Ma s), M. Ahmed (University of Kashmir) and S. Venkataraman (M. I. T., Madr participated in the symposium besides the academic members of the institute. T final day of the symposium was devoted to mathematics.

The proceedings of the above symposium published as MATSCIENCE REPORT 92.

Conference on "Structure of Matter: Mathe tics and Phenomenology"

The Institute conducted a conference on the bove title from 11th to 14th February 1978 at Mysore. The conference was ıugurated by Professor Alladi Ramakrishnan. In his inaugural address the D tor explained some important concepts in the special theory of relativity—(i) the locity transformation formula as a starting point to the special theory of relativity i) the transformation formula as a conservation law leading to new symmetry pri ıles and (iii) a new light on Lorentz contraction—exterior relative velocity. He ɜssed the importance of such small conferences where active workers in the field mathematical sciences could participate and discuss problems of mutual inte t. About thirty participants from various centres in the country took part the proceedings, besides a visitor Professor N. B. Backhouse from the Univ ity of Leverpool, U.K. The proceedings of this conference has been published as ATSCIENCE REPORT 93.

Conference on "Mathematical Methods in Physics"

Matscience conducted another conference on Mathematical Methods in Physics for four days from 27th August 1978 at Mysore. The inaugural address was delivered by Professor Alladi Ramakrishnan who pointed out the need to encourage active young research workers.

More than forty papers were presented by the participants from all over India.

Academic Staff

Professor Alladi Ramakrishnan	Director
Dr. R. Vasudevan	Professor
Dr. K. R. Unni	,,
Dr. N. R. Ranganathan	,,
Dr. T. S. Santhanam	,,
Dr. V. Radhakrishnan	Associate Professor
Dr. K. H. Mariwalla	,,
Dr. K. Srinivasa Rao	,,
Dr. R. P. Agarwal	Assistant Professor
Dr. R. Parthasarathy	,,
Dr. R. Sridhar	,,

Senior Research Fellows:

Dr. V. V. Rama Rao*

Junior Research Fellows:

Mrs. N. Indira **	Mr. C. Jayaram
Miss. S. N. Uma	Mr. E. Thandapani
Mr. V. N. Sridhar	Mr. S. Padmanabhan
Mr. J. S. Prakash	

U.G.C. Teacher Fellows:

Miss. S. Susila

Mr. P. R. Vittal

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* Person who have completed their tenure at the Institute.

**National Science Talent Scholar.

Delegations and Invitations

Professor Alladi Ramakrishnan spent ten weeks (March 6—May 20) at the Department of Physics, La Trobe University, Melbourne, as a Visiting Professor at the kind invitation of Professor C. J. Eliezer. He delivered a course of sixteen lectures on quantum mechanics at La Trobe and gave seminars on his recent research work at the University of Adelaide, Australian National University, Canberra and the School of Physics, University of Sydney.

He participated in the conference at Oberwolfach on Operations Research during the month of November and lectured at the University of Bonn at the invitation of Professor K. Bleuler under the auspices of the German Academic Exchange Services. He spent six weeks in the United States lecturing at the University of Michigan, Ann Arbor ; Rensselaer Polytechnic Institute, Troy, New York ; Catholic University, Washington; University of Texas at Dallas; Southern Methodist University, Dallas; University of Oklahoma, Stillwater; Los Alamos Scientific Laboratory, New Mexico; Rockwell International, Los Angeles; University of California at Irvine; SLAC, Stanford ; University of Alberta, Edmonton and University of Manitoba, Winnipeg, Canada.

Professor R. Vasudevan participated in the All India Symposium on Biomedical Engineering at Osmania University, Hyderabad (June, 1978). Visited BARC, Trombay, Bombay and delivered a talk on radiation transport (November 1978).

Professor K. R. Unni was invited to give the C. E. Cullis Memorial Lecture on Segal algebra at Calcutta Mathematical Society on 7th September 1978. He gave three lectures on Topological groups in the Summer School organised by the Calicut University during July 1978 and two lectures on Approximation Theory at the Workshop in Mathematics conducted by the University of Kerala during August 1978.

Professor N. R. Ranganathan spent a month (10th March to 10th April 1978) in the theory division of BARC at the invitation of Professor N. S. Satyamurthy. During his stay he not only delivered lectures on his work at BARC but also gave seminars in TIFR and Indian Institute of Technology, Powai, Bombay. He participated in the International Conference on Group Theory and Mathematical Physics held at Austin, Texas from 11th to 16th September 1978 and presented a paper on Molien Functions for Symmetric groups in the conference. During his stay in USA he also gave seminars in physics department of Rensselaer Polytechnique Institute, Troy, N.Y. and Syracuse University, Syracuse. He also gave a colloquium arranged jointly by the departments of mathematics and physics of State University of New York, Albany. On his way back from USA he spent a fortnight in the International Centre for Theoretical Physics, Trieste, Italy.

Professor T. S. Santhanam is currently away on a visiting assignment as a Senior Research Fellow in Australian National University, Canberra.

Dr. K. H. Mariwalla participated in the International meeting on Frontiers of Physics, held at Singapore (August 14–18, 1978) and presented two papers. He participated in the 8th annual General Relativity and Gravitation conference held at Bhavanagar (December 31, 1977—2nd January 1978). He gave a talk at BARC on Quantum Evaporation of a blackhole in projective relativity (5th January 1978).

Dr. V. Radhakrishnan gave a series of lectures on Magnetic properties of solids at the Dept. of Nuclear Physics, University of Madras, during February 1978.

Dr. K. Srinivasa Rao was invited to participate in the International Symposium on Photo-pion Nuclear Physics held at Troy, New York from 9th to 12th August and presented two papers. He is currently away on a visiting assignment as a Visiting Associate Professor at Rensselaer Polytechnic Institute, Troy, New York.

Dr. R. P. Agarwal was invited to give lectures at I.I.T., Madras and at Indian Institute of Science, Bangalore, on Hyperbolic differential equations with deviating arguments, during November, 1978.

Dr. R. Parthasarathy attended the Winter School on "Nuclear Reactors and Nuclear Reactions" held at International Centre for Theoretical Physics (ICTP), Trieste, Italy during 20th January to 8th March 1978. He participated in the workshop on "Few body problems in Nuclear Physics" held at ICTP for 10th to 14th March 1978. He was invited as a Visiting Assistant Professor to the department of physics, I I.T. Bombay for a period of one month (June, 1978) and gave seminars on "Gamma–Neutrino angular Correlations in muon capture" at BARC and I.I.T, Bombay. He participated in the Fourth High Energy Physics Symposium at University of Rajasthan, Jaipur during December 5th to 9th, 1978 and his work on (i) Second class currents and structure of elementary particles (ii) Quenching of Cabbibo angle in muon capture.

Dr. R. Sridhar was invited to participate in the Sanibel Symposium (International Symposium on Atomic and Molecular Physics) held at Palmbeach. Florida, during 9th March to 16th March, 1978 and presented his work on Quantum Fluids. He also delivered a talk entitled "Use of sum rules in the theory of superfluid He^4" in the theoretical physics department of the University of Madras (14th Dec. 1978).

Invited Lectures

Professor N. B. Backhouse Department of Applied Mathematics, University of Liverpool, England.	(i) 'The invariants of Lie superalgebras'—I (ii) ,, —II	January
Professor J. Pasupathy Centre for Theoretical Studies Indian Institute of Science Bangalore.	' Properties of New particles '	,,
Professor N. Mukunda Centre for Theoretical Studies Indian Institute of Science Bangalore.	' Aspects of the Hamilton Jacobi form of the dynamics '	,,
Dr. M. Ahmed Department of Physics University of Kashmir Srinagar.	' Structure of Superfluid He—4 '.	,,
Mr. P. K. Krishnamurthy Lecturer in Mathematics Regional Engineering College Trichy.	' Three point Boundary value problems '	,,
Dr. R. Jagannathan Department of Physics St. Joseph's College Trichy.	' Isotopic invariants in molecular vibration theory	February
Dr. V. S. Ramachandran Trinity College Cambridge, England.	' Learning-like phenomena in nerve cells in the visual cortex '	,,

Dr. R. Jagannathan Department of Physics St. Joseph's College Trichy.	' Representation of Para-Bose algebra in terms of Boson operators '	April
Dr. S. C. Phatak Pool Officer, Visiting Lecturer Department of Nuclear Physics Bhabha Atomic Research Centre Bombay.	' Interactions of Pions with nuclei '	April
Dr. R. Jagannathan Department of Physics St. Joseph's College Trichy.	' Quasi-momentum representations in quantum mechanics '	,,
Dr. Krishnaswamy Alladi University of California Los Angeles, USA.	' Certain multiplicative sums and their applications to prime number theory ' I—III.	May
Professor S. D. Sharma Department of Physics Punjabi University Patiala.	' On predication of Pluto and another transplutonium planet by Venkatesh Ketakar earlier than 1915 '	,,
Professor M. Ramamohana Rao Department of Mathematics Indian Institute of Technology Kanpur.	' Two dimensional systems—limit cycles '	June
Dr. Sita Bhaskaran Department of Applied Mathematics University of Adelaide Adelaide, Australia.	' Optimal design of gas pipeline networks '	,,
Dr. C. P. Singh Centre for Theoretical Studies Indian Institute of Science Bangalore–560012.	' Status of Iizuka—Okubozwig rule in particle physics '	July

Dr. S. Ranganathan Royal Military College of Science, Kingston, Canada.	' Correlation functions in fluids '	July
Dr. Pradeep Kumar University of Southern Colifornia Los Angeles, USA.	(i) ' Instabilities in supermatter ' (ii) ' Soliton dynamics '	August
Professor J. Sethuraman University of Florida USA.	Statistically motivated proof of some limit in statistical mechanics	,,
Professor H. Uberall Catholic University Washington D.C., USA.	' Communications with neutrino beams '	,,
Professor C. K. Majumdar Palit Professor, University of Calcutta, Calcutta.	' Classical Gas-liquid transition '	,,
Dr. N. R. Nandakumar Al-Fateh University Sebha, Libya.	' Ring derivations on function algebras '	September
Professor John H. Miller School of Mathematics University of Dublin, Trinity College, Dublin, Ireland.	' The covergence uniform in Epsilon of numerical methods for some singular pertur-bation problem '	,,
Dr. N. Prabhakara Rao Department of Mathematics Siddhartha Engineering College Vijayawada-10.	(i) ' Brouwerian semigroups ' (ii) ' Griss algebras '	,,
Professor U. Maor Department of Physics & Astronomy, Tel-Aviv University, Israel.	' Ozi rule in particle physics '	,,
Professor K. V. L. Sarma Tata Institute of Fundamental Research, Bombay.	' Implications of SLAC e-d experiment '	November

Dr. R. Jagannathan Department of Physics St. Joseph's College Tiruchirapalli.	" A new operator representation of Dirac algebra "	December
Professor Jean Bass University of Paris France.	" Harmonic analysis of physical phenomena stationary function—Limits of sequence of periodic or almost periodic functions "	,,
Dr. P. V. Subrahmanyam Lecturer, P. G. Centre Trichy.	" Fixed point theorems and functional equations "	,,
Dr. B. S. Rajput Indian Statistical Inst. New Delhi and University of Tennessee USA.	" 0—1 Dichotomy, seminorm integrability and support theorems for semi stable laws on LCTVS "	,,

List of Publications

Professor Alladi Ramakrishnan

1. Unnoticed Symmetries in Einstein's special relativity, Jour. Math. Anal. and Appl. USA **63** (1978) 335.

2. A New Look at Matrix Operations—Proc. of the Conference Oberwolfach, December, 1977 (Methoden und Verfahren der mathematischen Physik—Eds, B. Brosowski and E. Martensen) Peter Lang, 1978.

3. New Facets and New Concepts in the Special Theory of Relativity—Proc. of the Conference Oberwolfach, December, 1977 (Methoden und Verfahren der mathematischen Physik—Eds. B. Brosowski and E. Martensen) Peter Lang, 1978.

Professor R. Vasudevan

1. Representation of a para—Bose algebra using a single Bose field (with R. Jagannathan—to appear in Jour. Math. Physics, USA. (1979).

2. On the Kq representations in quantum mechanics (with R. Jagannathan) Accepted for publication in Jour. of Phys.—A. London.

3. Imbedding approach to first passage problems for bounded processes—The case of Poisson jumps with decay. (with A. Vijayakumar and P. R. Vittal) Proceedings of Tamil Nadu Academy of Sciences V 2, (1979).

4. Quasilinearisation and Matrix Riccati equation (with R. Bellman) Jour. Math. Anal. & Appl. **63** (1978).

5. A note on the representations of para-fermi algebra (with R. Jagannathan) Jour. Math. Phys. **19** (1978).

6. Motion of electrons in solids and quantum mechanical representations—To appear in Matscience Report No. 96.

7. Angular momentum Coherent states (with T. S. Santhanam) Matscience Report No. 93—Conference on Structure of Matter, Feb. 1978.

8. Imbedding approach to first passage problems for bounded processes—The case of Poisson jumps (with A. Vijayakumar and P. R. Vittal) Proc. of the Symp. on Queues, Inventeries and Reliability, Annamalai University, Aug. 1978.

Professor N. R. Ranganathan

1. Molien functions for Symmetric groups (with J. S. Prakash) Proceedings of the International Conference on Group theory and Mathematical Physics, Austin, Texas (1978) (Springer Verlag).

2. Can we consider Neutrinos as Matter? Matscience Report No. 93—conference on structure of Matter, Feb. 1978.

Professor T. S. Santhanam

1. Quantum mechanics in Finite space
Aust. Jour. Phys. **31**, 233 (1978).

2. New Particles—Proc. Sixteenth Anniversary Symposium on New Particles—do they imply new physics? Matscience Report No. 92.

Professor V. Radhakrishnan

1. Instability in solid state of matter, Conference on Structure of Matter—Matscience Report No. 93.

2. Binding Energy calculation by Matrix Methods (with G. Ramamurthy)—Conference on Mathematical methods in Physics—to appear in Matscience Report No. 96.

3. A possible universal theory for phase—transitions—Conference on Mathematical methods in Physics—to appear in Matscience Report No. 96.

4. Lattice distortion in insulators—Proc. Tamil Nadu Academy of Sciences, Vol. 1, 225, (1978).

Professor K. H. Mariwalla

1. Black hole evaporation in projective relativity (to be published in Physics Letters A, V. 68, 409, 1978).

2. Relativity of Paths—applications to mechanics and cosmology—to be published in Proc. International meeting on Frontier's of Physics—Singapore, 1978.

3. Complementarity and coherence—(to be published in the Proc. Tamil Nadu Academy of Sciences, V. 2, 1979).

Professor K. Srinivasa Rao

1. "A note on the symmetries of the 3j—coefficient" J. Phys. A: Math. Gen. V. II, (1978) L 69.

2. "Cluster Model Wave function and the r.m.s. radius of ^{7}Li" (with R. Sridhar) —Physica Scripta, **17** (1978) 557.

3. "New Fortran Programs for Angular Momentum Coefficients" (with K. Venkatesh) Comp. Phys. Comm. **15** (1978) 227.

4. "The ^{6}Li $(\gamma, \pi^{\circ} d)$ ^{4}He reactions" (with R. Sridhar and S. Susila) Proc. Int. Symp. on Photopion Nucl. Phys., Troy, (1978) (Plenum Press) in print.

5. "Negative pion photoproduction from ^{28}Si (with S. Susila) (Proc. Int. Symp. On Photopion Nucl. Phys., Troy, (1978) (Plenum Press) in print.

6. "Developments in charged pion photoproduction from Nuclei"—Proc. Tamil Nadu Acad. Sci. **1** (1978), 127.

Professor R. P. Agarwal

1. Improved error bounds for the Picard iterates—Jour. Mathl. Phyl. Sci. India, 12, 45 (1978).

2. On linear two-point boundary value problems with a parameter—Jour. Mathl. Phyl. Sci. India, 12, 61 (1978).

3. On discreate boundary value problems—Proc. Tamil Nadu Acad. Sci. India, **1** (1978).

4. An identity for Green's function of multipoint boundary value problems to appear in Proc. Tamil Nadu Acad. Sci. India V. 2, (1979).

5. On hyperbolic delay differential inequalities (with E. Thandapani) to appear in Proc. Tamil Nadu Acad. Sci. India V. 2, (1979).

6. Existence and uniqueness for non-linear functional differential equations (to appear in Indian Jour. Pure and Appl. Math.)

7. The numerical solution of multipoint boundary value problems to appear in Jour. Computational and Appl. Math. Belgium 5, (1979).

8. On the periodic solutions of nonlinear second order differential systems to appear in Jour. Computational and Appl. Math. Belgium 5, (1979).

9. Asymptotic behaviour and oscillation of solutions of differential equations with deviating arguments (with E. Thandapani) (to appear in Bollettino della Unione Matematica Italiana, Italy).

10. Boundary value problems for n-th order differential equations (with P. R. Krishnamurthy) to appear in Bulletin of the Institute of Mathematics, Academia Sinica, Republic of China.

11. On multipoint boundary value problems—to appear in Matscience Report.

12. On the uniqueness of solutions of hyperbolic delay differential equations—(with E. Thandapani) to appear in Matscience Report and also in Mathematics seminar notes, Kobe University, Japan.

Professor R. Parthasarathy

1. Quenching of Cabibbo angle and total muon capture rates (with V. N. Sridhar) Canadian Jour. of Physics, Vol. 56, No. 12 (1978).

2. Gamma-Neutrino angular correlations in muon capture by ^{28}Si (with V. N. Sridhar) Physical Review C, 1978 (Oct.).

3. Recent developments in weak interactions theories to—appear in Proceedings of Tamil Nadu Academy of Sciences V. 2 (1979).

4. Muon capture—Matscience Report 92—Proc. of the Sixteenth Anniversary Symposium, 1978

5. Total Muon capture rates in Neon isotopes—A test for projected Hartree Fock wave functions—to appear in Matscience Report No. 96.

Professor R. Sridhar

1. Recent developments in the collective variable theory of liquid He^4 (Proc. Tamil Nadu Acad. Sci. 2, 1979)—to appear.

2. Cluster model wave function and the r.m.s. radius of Li (with K. Srinivasa Rao) Physica Scripta 17, 557 (1978).

3. On the ^{6}Li (γ. π° d) ^{4}He reaction (with K. Srinivasa Rao and S. Susila) Proc. Int. Symp. on Photopion Nuclear Physics (Rensselaer Polytechnic Institute, Troy, N.Y.) August 1978 (in print).

4. Recent development in the Application of sum rules in superfluid ^{4}He—Proc. of the Matscience conf. on "Structure of Matter"—Matscience Report No. 93.

5. On a phenomenological theory of the Liquid structure factor for Helium 4—Matscience Report 92.

S. Susila

1. Negative pion photoproduction from ^{28}Si (with K. Srinivasa Rao) Proc. Inter. symp. on Photopion Nuclear Physics (Rensselaer Polytechnic Institute) Troy, N.Y.) Aug. 1978 (in print).

2. On the ^{6}Li (γ, π° d) ^{4}He reaction (with R. Sridhar and K. Srinivasa Rao, Proc. Int. Symp. on Photopion Nuclear Physics (Rensselaer Polytechnic Institute, Troy, N.Y.) (Aug. 1978) (in print).

P. R. Vittal

1. Imbedding approach to first passage problem for bounded processes—the case of Poisson jumps with decay (with Prof. R. Vasudevan and A. Vijayakumar)—Proceedings of Tamil Nadu Academy of Sciences, V. 2 (1979).

2. Imbedding approach to first passage problems for bounded processes—the case of Poisson jumps (with Prof. R. Vasudevan and A. Vijayakumar)—Proc. of the Symp. on Queues, Inventories and Reliability, Annamalai University, Aug. 1978.

3. A level crossing problem—to appear in Matscience Report No. 96.

S. N. Uma

1. A note on super-determinant—Proc. of Tamil Nadu Academy of Sciences, Vol. 2 (1979)—to appear.

C. Jayaram

1. Remarks on a class of 0—Distributive lattices—Proc. Tamil Nadu Acad. of Sciences, Vol. 1, 1978, p. 199.

2. Structure theory of prime semilattices—Proc. Tamil Nadu Acad. Sciences, V. 1, 1978, p. 175.

3. Characterization of a class of dually residuated lattice ordered semi-groups by Sheaves (with V. V. Rama Rao), Proc. Tamil Nadu Acad. Sciences V. 1, 73 (1978).

E. Thandapani

1. On hyperbolic delay differential in-equalities (with R. P. Agarwal) to appear in Proc. Tamil Nadu Acad. Sciences, V. 2 (1979).

2. Asymptotic behaviour and oscillation of solutions of differential equations with deviating arguments (with R. P. Agarwal)—to appear in Bollettino della Unione Matematica Italiana, Italy.

3. On the uniqueness of solutions of hyperbolic delay differential equations (with R. P. Agarwal)—to appear in Matscience Report and also in Mathematics Seminar Notes, Kobe University, Japan.

V. N. Sridhar

1. Quenching of Cabibbo angle and total muon capture rates (with R. Parthasarathy) Canad. Jour. of Physics, Vol. 56, **12** (1978).

2. Gama—Neutrino angular correlations in muon capture by ^{28}Si (with R. Parthasarathy) Physical Review C—Oct. 1978.

J. S. Prakash

1. Molien functions for Symmetric groups (with N. R. Ranganathan) Proceedings of the International Conference on Group Theory and Mathematical Physics, Austin, Texas (1978) (Springer Verlag).

2. Molien series and cycle index of the symmetric group—Matscience Report No. 93—Conference on Structure of Matter, Feb. 1978.

LIBRARY

1.	Number of Vols. in the Library as on 31-12-1977 (including books and bound vols. of periodicals)	...	15,200
2.	Number of Vols. added upto December 1978	...	787
3.	Total number of Vols. in the library as on 31-12-78	...	15,987
4.	Current Journals being subscribed in the library (List given below)	...	71
5.	Number of Journals and Lecture Notes being received by the library on EXCHANGE basis (List given below)	...	41
6.	Number of Matscience Reports published upto December 1978 (List of available reports are given below)	...	94

		Within India	*Outside India*
7.	Number of Reports sold during 1977-78 (i.e. from April 1977 to March 1978)	363	82

LIST OF AVAILABLE MATSCIENCE REPORTS AND SEMINAR IN ANALYSIS

Report No.	*Author(s)*	*Title*
9	L. I. Schiff	Lectures on Gravitation, (1963).
55	H. S. Shapiro	Smoothing and approximation of functions, (1966).
57	K. Srinivasa Rao & R. Sridhar	Nuclear models and nuclear matter, (1967).
60	—	Proceedings of the conference on Clifford Algebra, its generalization and Applications, 1971.
62	R. H. Good	Description of particles with any spin and with internal symmetry, (1968).

Report No.	*Author(s)*	*Title*
66	F. Riahi	Lectures on non-relativistic scattering theory, (1969).
67	K. Srinivasa Rao (Ed.)	Proceedings of the one day symposium on computers in science and technology, (1969).
71	A. R. Prasanna	General relativity and cosmology, (1970).
72	A. R. Prasanna	Gravitational collapse and gravitational radiation, (1971).
74	Krishnaswami Alladi	Contributions to number theory. (1972).
75	Alladi Ramakrishnan	Essays on Scientific Topics, (1972).
76	—	Proceedings of the conference on "Cosmology, Gravitation & Applications to Particle Theory", Bangalore, 1971.
77	—	Proceedings of the conference on "Fourier Optics, Lasers & Holography", Bangalore, (1973.)
78	—	Proceedings of the conference on "Nuclear Physics", Mysore, 1973.
79	—	Proceedings of the conference on "Numerical Analysis & Combinatorial Methods" Bangalore, (1973).
80	Krishnaswami Alladi	Lectures on Diophantine Approximations. (1974).
81	Alladi Ramakrishnan	Applications of the theory of stochastic processes to physical problems, (1974).

Report No.	*Author(s)*	*Title*
82	Vimala Walter	On fundamental and interpolating Spline functions. (1975).
83	Krishnaswami Alladi	New concepts in Arithmetic functions, (1975).
84	K. H. Mariwalla	Introduction to Vectors, Tensors and Relativity. (1975).
85	R. Vasudevan (Ed.)	Proceedings of the conference on "Mathematics in Medicine and Biology", Bangalore. 1974.
86	A. Ramakrishnan	Essays on Scientific Topics II.
87	—	Proc. of the conference on Matrix Algebra, Computational Methods and Number Theory— Mysore, 1976.
88	B. R. Gudagudi	Some studies in Pathos Graphs, 1977.
89	—	Proceedings of the Conference on Mathematics, in Social, Economic and Life Sciences. Mysore, 1977.
90	Alladi Ramakrishnan	Stochastic Processes in Physics and Astronomy, 1978.
91	—	Proceedings of the Conference on Mathematical Analysis and its applications, 1978.
92	Alladi Ramakrishnan	Proceedings of the Sixteenth Anniversary Symposium on new Particles--Do they imply New Physics ? 1978.
93	R. Sridhar (Ed.)	Proceedings of the Conference on Structure of Matter : Mathematics and Phenomenology, 1978.

Report No.	*Author(s)*	*Title*
94	V. V. Rama Rao	On a Problem of Garrett Birkhoff and related topics, 1978.

SEMINAR IN ANALYSIS

1	K. R. Unni	Lectures on Bernstein approximation problem, (1969).
4	A. L. Brown	Abstract approximation theory, (1970).
5	S. P. Singh	Fixed Point Theorem.
	Vimala Walter	Splines in Banach Spaces.
	G. N. Keshava Murthy	Multipliers on Segal Algebras.
6	S. P. Singh	On Fixed point theorems, (1975).

The above reports are available at Rs. 10/- (Within India) and at $ 2-00 (Outside India).

List of Journals

1. Acta Mathematica
2. Advances in Physics
3. Advances in Applied Probability
4. Algebra Universalis
5. American Mathematical Monthly
6. American Journal of Mathematics
7. American Journal of Physics
8. Annals of Physics
9. Annual Review of Nuclear Science
10. Astrophysics & Space Science
11. Bulletin, American Mathematical Society
12. Canadian Journal of Mathematics
13. Communications on pure & applied Mathematics
14. Comments on Solid State Physics
15. Contemporary Physics
16. Differential Equations
17. Fortschritte der Physics
18. General Relativity & Gravitation
19. Graph theory
20. International Journal of Theoretical Physics
21. JETP Letters
22. Journal of Applied Probability
23. Journal of Approximation theory
24. Journal of Computational Physics
25. Journal of Differential Equations.
26. Journal of Functional Analysis
27. Journal of Mathematical Physics
28. Journal of Number Theory
29. Journal of Physics "A"; "C"; "G"
30. Journal of Theoretical Biology
31. Mathematical Biosciences
32. Mathematical Reviews
33. Mathematische Annalen
34. Mathematische Zeitschrift
35. Nature
36. Neurological Research Journal
37. New Scientist with index
38. Notices of American Mathematical Society
39. Nuclear Physics (A & B)
40. Numerische Mathematik
41. Nuovo Cimento (Nuovo Cimento A, B & C; Letter al Nuovo Cimento & Revista del Nuovo Cimento)
42. Pacific Journal of Mathematics
43. Physica "A" & "B+C"
44. Physical Review (ABCD + Index)
45. Physical Review Letters
46. Physics Bulletin
47. Physics letters (ABC)
48. Physics Today
49. Proceedings, American Mathematical Society
50. Proceedings, Royal Society of London "A"
51. Progress of Theoretical Physics

52. Physical Society of Japan, Journal
53. Reports on Progress in Physics
54. Reviews of Modern Physics
55. Russian Mathematical Surveys
56. SIAM Journal of Math. Analysis
57. SIAM Journal of Applied Mathematics
58. SIAM Review
59. SIAM Journal of Numerical Analysis
60. Solid State Communications
61. Soviet Journal of Nuclear Physics
62. Soviet Mathematics (Doklady)
63. Soviet Physics (JETP)
64. Soviet Physics (USPEKHI)
65. Stochastic Processes & their applications
66. Theory of Probability & its applications
67. Topology
68. Transactions of the American Mathematical Society
69. Utilitas Mathematica
70. Zeitschrift fur Wahrsceinlich Keits theorie und verwandte gebiete

List of Exchange Journals and Lecture Notes

1. Annals Academiae Scientiarum Finnicae Series A-Mathematics.
2. Annales de Institut Fourier.
3. Arkiv for Mathematik.
4. Brazilian Energy Statistics.
5. Brazilian Journal of Physics-Revista Brasileira de Fisica.
6. Bulletin of Fukuoka University of Education.
7. Bulletin of the Institute of Mathematics-Academia Sinica.
8. Canadian Journal of Physics.
9. CERN Reports.
10. Courant Institute of Mathematical Sciences-Lecture Notes.
11. Duke Mathematical Journal.
12. ERDA: Energy Research Abstracts (Formerly Nuclear Science Abstracts)
13. Fibonacci Quarterly.
14. Hiroshima Mathematical Journal
15. Indagationes Mathematicae.
16. ICTP-Preprints
17. Israel Journal of Mathematics
18. Journal of Computing Mathematics and Mathematical Physics (Bulletin of the USSR Academy of Sciences).
19. Journal of the Indian Institute of Sciences.
20. Journal of Faculty of Sciences-Series I Mathematics.
21. Kodai Mathematical Journal.
22. Mathematicae Japonicae.
23. Mathematical Gazette.
24. Mathematisk Institut, Aarhus University-Lecture Notes.
25. Michigan Mathematical Journal.
26. Moscow University Herald Series-Mathematics.
27. Nagoya Mathematical Journal.
28. Nanta Mathematica.

29. NORDITA Lecture Notes.
30. Nuclear Active.
31. Osaka Journal of Mathematics.
32. Proceedings of the Japan Academy.
33. Queen's Papers in Pure and Applied Mathematics-Lecture Notes.
34. Research Institute of Mathematical Sciences-Series A.
35. Sankhya Parts A and B.
36. Studia Universitatis Babes-Bolyai (Series Mathematica and Series Physica.)
37. Tohoku Mathematical Journal.
38. Universite De Liege-Lecture Notes.
39. Universite De Montreal-Lecture Notes.
40. Universite De Paris-Sud-Lecture Notes.
41. Yokohama Mathematical Journal.

SYMPOSIA, SEMINARS AND SUMMER SCHOOLS, CONDUCTED BY MATSCIENCE

Anniversary Symposia at MATSCIENCE, Madras

Year	*Title*	*Period*
1963	Resonance States in Elementary Particles	14–16, January
1964	Recent Trends in Theoretical Physics	3– 7, ,,
1965	Third Anniversary Symposium	3–12, ,,
1966	Fourth Anniversary Symposium	3– 9, ,,
1967	Fifth Anniversary Symposium	2–15, ,,
1968	Sixth Anniversary Symposium	17–31, ,,
1969	Seventh Anniversary Symposium	20–25, ,,
1970	Eighth Anniversary Symposium	10–14, ,,
1971	Ninth Anniversary Symposium	12–18, ,,
1972	Tenth Anniversary Symposium	8–10, ,,
1973	Eleventh Anniversary Symposium and International Conference on Functional Analysis	1– 7, ,,
1974	Twelfth Anniversary Symposium	10–12, ,,
1975	Thirteenth Anniversary Symposium	4, ,,
1976	Fourteenth Anniversary Symposium	6–9, ,,
1977	Fifteenth Anniversary Symposium	24–25, ,,
1978	Sixteenth Anniversary Symposium	9–12, ,,

Summer Schools and Conferences

Year	*Title*	*Period*	*Venue*
1963	High Energy Physics	1—15, June	KODAIKANAL
1964	Theoretical Physics	24 Aug.—13 Sept.	BANGALORE
1965	Theoretical Physics	17 Aug.—4 Sept.	BANGALORE
1966	Recent Trends in Theoretical Physics	27 Sep.—15 Oct.	BANGALORE
1967–68	First Seminar in Analysis	20 Dec. 67—16 Jan. 68.	MADRAS
1968	Fourth Matscience Summer School	24—28, Sept.	MADRAS
1968–69	Second Seminar in Analysis	26 Dec. 68—10 Jan. 69	MADRAS
1970	Frontiers of Physics	14—20, Sept.	OOTACAMUND
1970	Elementary Particles and Nuclear Physics	22—31, Jan.	BANGALORE
1970	Third Seminar in Analysis	18th Feb. to 2nd March	OOTACAMUND
1971	Clifford Algebra, its Generalization and Applications	30—31, Jan.	OOTACAMUND
1971	Fourth Seminar in Analysis	1—10, Feb.	OOTACAMUND
1971	Cosmology, Gravitation and Applications to Particle Theory	5—9, Nov.	MYSORE
1971	Fourier Optics, Lasers and Holography	11—15, Nov.	BANGALORE
1972	Twin Conferences 1. Fifth Seminar in analysis and 2. Symposium on Matrix Theory.	11—22, March	BANGALORE
1973	Nuclear Physics	1—5, March	BANGALORE
1973	Numerical Analysis and Combinatorial Methods	9—16, March	BANGALORE

Year	*Title*	*Period*	*Venue*
1973	Probability Theory and Stochastic Processes	24—30, Sept.	BANGALORE
1974	Sixth Seminar in Analysis	11—20, Feb.	BANGALORE
1974	Mathematics in Medicine and Biology	12—23, Feb.	BANGALORE
1974	Green's Functions	22—26, Sept.	MYSORE
1975	Seventh Seminar in Analysis	8—17, March	MPSORE
1975	Collective Phenomena in Nuclei and Solids	13—16, Dec.	MYSORE
1976	Computational Methods, Matrix Algebra and Number Theory	6—9, Sept.	MYSORE
1977	Mathematics in Social, Economic and Life Sciences	4—7, March	MYSORE
1977	Mathematical Analysis and its Applications	7—10, Sept.	MYSORE
1978	Structure of Matter: Mathematics and Phenomenology	11—14, Feb.	MYSORE
1978	Mathematical Methods in Physics	28—31, Aug.	MYSORE
SPECIAL ONE-DAY SYMPOSIA			
1968	Mathematics as a stimulus to Physical thought (in honour of Professor Marshall Stone)	29 Dec.	MADRAS
1969	Computers in Science and Industry	25 March	MADRAS
1970	IMPACT Conference on 'Coordinate Transformations and their Appplications'	1 April	MADRAS
1970	IMPACT Conference on 'Development in Aviation and their economic Impact on India'	20 Sept.	MADRAS
1971	Fifty Years of Mathematical Education in India	29 Dec.	MADRAS

MASTECH CONFERENCES

(Sponsored by the Council of Scientific and Industrial Research)

Year	*Title*	*Period*	*Venue*
1969	Matrix Analysis and Applications to Science and Technology	25 Sept. to 3 Oct.	BANGALORE
1970	Probability and Statistics and their Applications to Science and Technology	14—20, Jan.	MADRAS
1971	Statistical Mechanics and their Applications to Science and Technology	24—27, Jan.	BANGALORE
1971	Functional Analysis and its Applications to Science and Technology	14—17, Sept.	BANGALORE

INSERVICE TRAINING PROGRAMME

(Sponsored by the Directorate of Collegiate Education)

1973	Inservice Programme for the Mathematics Teachers	1—15, May	MADRAS