

**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
1981**

Patron :

Mr. C. Subramaniam

Chairman of the Board of Governors :

Hon'ble Mr. C. Aranganayakam

Minister for Education, Government of Tamil Nadu

Director :

Professor Alladi Ramakrishnan

Board of Governors

Chairman: Hon'ble Mr. C. Aranganayakam
Minister for Education
Government of Tamil Nadu.

Members : Mr. C. Ramdas, I.A.S.,
Commissioner and Secretary (Education)
Government of Tamil Nadu.

Mr. J. G. Kanga
Joint Secretary to Government of India
Department of Atomic Energy, Bombay.

Dr. P. K. Iyengar
Director, Physics Group
Bhabha Atomic Research Centre, Bombay.

Professor Alladi Ramakrishnan
Director, Matscience.

Professor N. R. Ranganathan
Matscience.

Finance Committee

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Government of Tamil Nadu.

Mr. J. G. Kanga
Joint Secretary to Government of India
Department of Atomic Energy, Bombay.

Professor Alladi Ramakrishnan
Director, Matscience.

Academic Staff

Director

Professor Alladi Ramakrishnan

Professors

Dr. R. Vasudevan

Dr. K. R. Unni

Dr. N. R. Ranganathan

Dr. T. S. Santhanam

Associate Professors

Dr. V. Radhakrishnan

Dr. K. H. Mariwalla

Dr. K. Srinivasa Rao

Dr. R. Sridhar

Dr. R. Parthasarathy

Dr. Krishnaswami Alladi

Assistant Professors

Dr. R. P. Agarwal

Dr. R. Jagannathan

Senior Research Fellow (DAE)

Mr. V. N. Sridhar

Junior Research Fellows

Mr. M. Venkatasatyanarayana

Mr. Premkumar Yesudian

Mr. S. Madivanane

Miss. A. Shanthi

Mrs. S. N. Uma *

Mr. J. S. Prakash *

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

Dr. R. Sridhar

Dr. R. Parthasarathy

Dr. Krishnaswami Alladi

* Persons who have completed their tenure at the Institute.

General Information

Aims and Objectives

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. Research fellowships are awarded by 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 for 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.

Library

I. BOOKS and PERIODICALS: During the year (1980-81) 964 books and bound volumes of periodicals were added to the collection. At present the library consists of 17815 volumes which includes the 30 volume set of "Encyclopedia Americana" presented by the American Center Library, Madras.

The following eight new journals were subscribed during 1981 in addition to the 73 journals subscribed during the year 1980.

1. Abstracts of Papers (AMS);
2. Advances in Applied Mathematics;
3. Annals of Mathematics;
4. European Journal of Physics;
5. International Journal of Mathematics and Mathematical Sciences;
6. Journal of Statistical Physics;
7. Mathematical Intelligencer;
8. Physica Scripta.

II. MATSCIENCE REPORTS: Publication of Matscience Reports on various topics in Physics and Mathematical Sciences is one of the important academic activities of the Institute. This is in pursuit of the objective of disseminating knowledge in the higher realms of Mathematical Sciences to a wider audience both inside and outside the country.

These Matscience Reports contain the lectures delivered by the faculty members and students of the Institute and the lectures of visiting scientists at the Institute. The reports are also devoted to the publication of the Proceedings of the Conferences and Symposia organised by the Institute. So far 105 such reports have been published and a list of available reports can be had from the Librarian on request. The following Matscience Reports were published during 1981:

<i>Report No.</i>	<i>Author</i>	<i>Title</i>
102	K. Srinivasa Rao	Lectures on the Lorentz Group and Related Topics (1981)
103	K. Srinivasa Rao & R. Parthasarathy, <i>Eds.</i>	Proceedings of the Conference on the Charmed Physics of the Seventies, Mysore, Nov. 25-30, 1979 (1981)
104	R. Jagannathan, <i>Ed:</i>	Proceedings of the Second Conference on Number Theory, Ooty, August 3-7, 1980 (1981)
105	R. Vasudevan, <i>Ed:</i>	Proceedings of the Conference on Mathematics in Economics, Engineering and Life Sciences, Mysore, March 19-22, 1980 (1981)

III. EXCHANGE: In addition to the existing list of 44 periodicals and lecture notes from Research Institutions throughout the world in exchange for Matscience Reports, the following seven new journals have been added:

1. Acta Arithmetica; 2. Bulletin of the University of Galati; 3. Chinese Journal of Mathematics; 4. Indian Journal of Pure & Applied Physics; 5. Journal of North Bengal University; 6. Rendiconti del Seminario Matematico della Universita di Padova; 7. Southeast Asian Bulletin of Mathematics

Efforts are being made to get more number of Journals in exchange for Matscience Reports.

IV. PREPRINTS: Approximately 150 preprints were received from Scientists and Institutions throughout the world like CERN, NORDITA, Institute for Advanced Study (Princeton), ICTP, LBL, SLAC etc. These are kept in the library for the purpose of reference.

News of the Institute

(1981)

The Nineteenth Anniversary of the Institute was celebrated on the 17th January 1981 and a Symposium on 'A Biographical Approach to Modern Physics (Planck to Salam, the Quantum to the Quark)' was organised. The symposium was inaugurated by His Excellency Mr. Sadiq Ali, Governor of Tamil Nadu. The portraits of Julian Schwinger and Emilio Segre were unveiled by Mr. Christopher L. Sholes, Director, USICA, Madras and the portraits of Sin-Itiro Tomonaga and Hideki Yukawa were unveiled by Mr. Masanari Ozaki, Consul General of Japan, Madras.

The Institute conducted a conference on 'Particle Interactions and Astrophysics' at Mysore during 4th to 8th February, 1981. Inaugurating the Conference Professor Alladi Ramakrishnan recalled the introduction of the charm quantum number by Professor Glashow at the Dubna Conference in 1964 and briefly outlined the further developments. About 40 scientists from all over India participated in this conference besides Professor K. Dietz from the University of Bonn, Germany and Professor C. J. Eliezer from La Trobe University, Australia who were at Matscience as visiting professors.

Matscience conducted the 'Third Conference on Number Theory' at Mysore during 3rd to 6th June 1981. Professor Paul Erdos from Mathematical Institute of the Hungarian Academy of Sciences, Budapest delivered the inaugural lecture on some current problems of interest in probabilistic number theory. Professors Paul Erdos, K. Ramachandra from T.I.F.R., Bombay and R. P. Bambah from Panjab University, Chandigarh and Dr. Krishnaswamy Alladi from the University of Michigan, Ann Arbor, USA were the principal lecturers. About thirty number theorists from all over the country participated in the conference. The proceedings of this conference is to be published by Springer-Verlag, West Germany.

The conference on 'Probability, Stochastic Processes and Applications' held at the Hindustan Photo Films' Club House at Ooty during 24th to 27th August 1981 was inaugurated by Professor Alladi Ramakrishnan who explained the deep significance of the frequency interpretation of probability and inverse problems in random processes. About 25 scientists participated in the conference.

12th January 1981 was a significant day for Matscience when Professor Abdus Salam spent an evening at the Institute during his brief visit to India. Welcoming the Nobel Laureate Professor Alladi Ramakrishnan recalled the miraculous circumstances of the birth of Matscience due to the joint interests of Professors Abdus Salam and Niels Bohr on the one hand and Mr. C. Subramaniam and Pandit Jawaharlal Nehru on the other.

This year also witnessed the memorable lectures at Matscience of Professor Paul Erdos, one of the greatest mathematicians of this century, one of the founders of probabilistic number theory and the prime exponent of graph theory.

During the 3rd week of December, Professor Rene Thom one of to-day's leading mathematicians, the Fields medallist for significant contributions to differential topology and the creator of Catastrophe Theory, gave lectures at Matscience on his work in Catastrophe Theory.

Delegations and Invitations

Professor Alladi Ramakrishnan was invited to spend a fortnight as a visiting scientist at the Fermi National Accelerator Laboratory, Batavia. He was also invited to lecture on his recent research work in the following centres of research during Feb - May, 1981: University of Denver at Colorado; University of Los Vegas; Rockwell International, California; University of California at Irvine; University of Texas at Arlington; (all in the U.S.A.), University of Bonn and Technical University of Clausthal at West Germany.

Professor R. Vasudevan was invited to spend a period of four months as visiting professor at the department of physics, University of California at Irvine, USA.

Professor K. R. Unni gave an invited talk at the 47th Conference of Indian Mathematical Society held at Allahabad during December 1981.

Professor T. S. Santhanam was a visiting professor at the department of physics and astronomy at the Southern Illinois University at Carbondale, USA. He also visited and lectured at SLAC, Stanford and University of Alberta at Edmonton, Canada. He gave an invited talk at the International Colloquium on Group theoretical methods in Physics held at Canterbury, UK during August 1981.

Dr. K. H. Mariwalla lectured in the summer school on non-linear partial differential operators and quantization procedures and also in the conference on Mathematical methods in Physics both held at the Technical University of Clausthal at West Germany during July - August 1981. During this visit he participated also in the Sixth International Conference on Mathematical Physics held at West Berlin. He was a visiting scientist for a month at the International Centre for Theoretical Physics at Trieste, Italy.

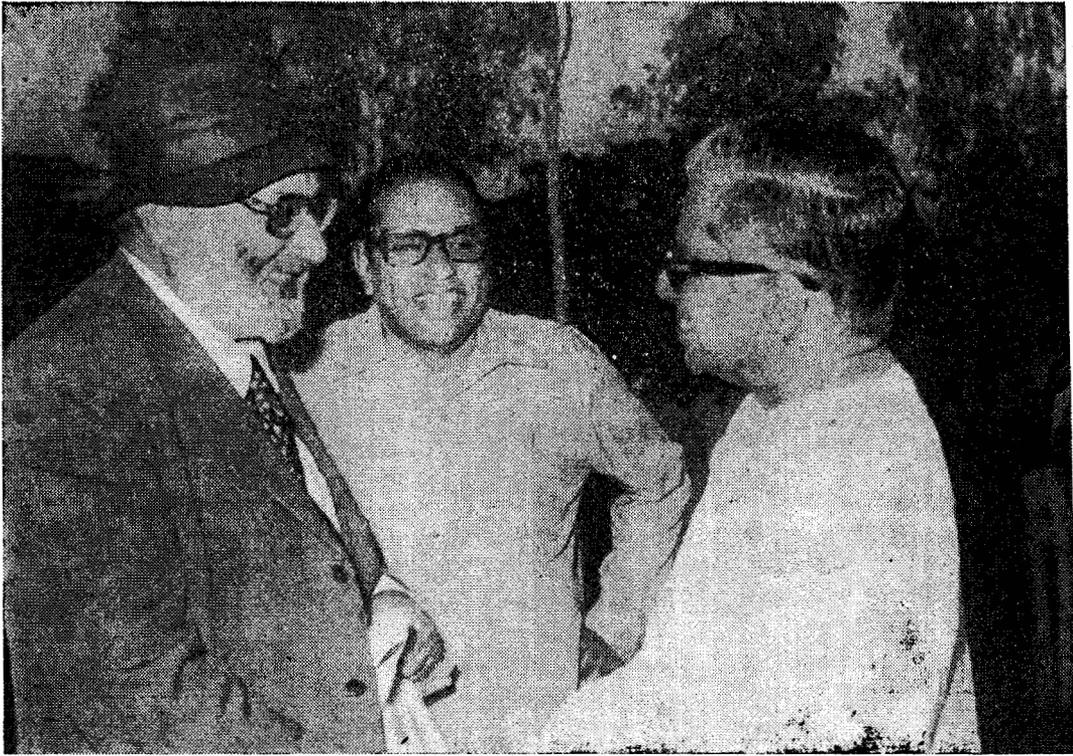
Dr. K. Srinivasa Rao spent a period of four months as Alexander von Humboldt Foundation Fellow at the Institute for Theoretical Nuclear Physics, the University of Bonn, West Germany. He gave invited lectures at the Queen Mary's College, Madras and at Fatima College, Madurai.

Dr. R. Parthasarathy was a visiting scientist at the Physical Research Laboratory at Ahmedabad during March 1981. Currently he is spending a period of one year as visiting associate professor at the Simon Fraser University, Canada.

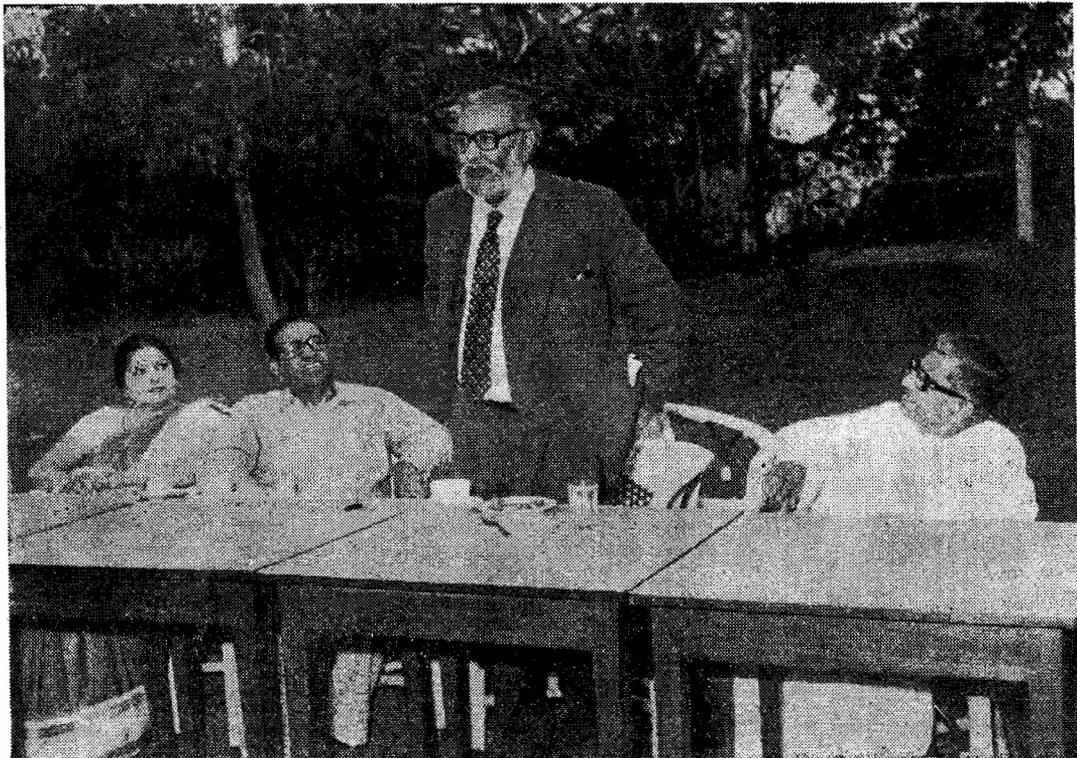
Dr. Krishnaswami Alladi who is at present a visiting member of the Institute for Advanced Study at Princeton, U.S.A., delivered a seminar at the Institute on his most recent research work. He was invited to deliver a lecture in a colloquium at the Pennsylvania State University and to give a seminar at the University of Michigan, Ann Arbor. He presented an invited paper at the West Coast Number Theory Conference at Santa Barbara in December 1981. He also visited the Department of Discrete Mathematics at the Bell Telephone Laboratories.

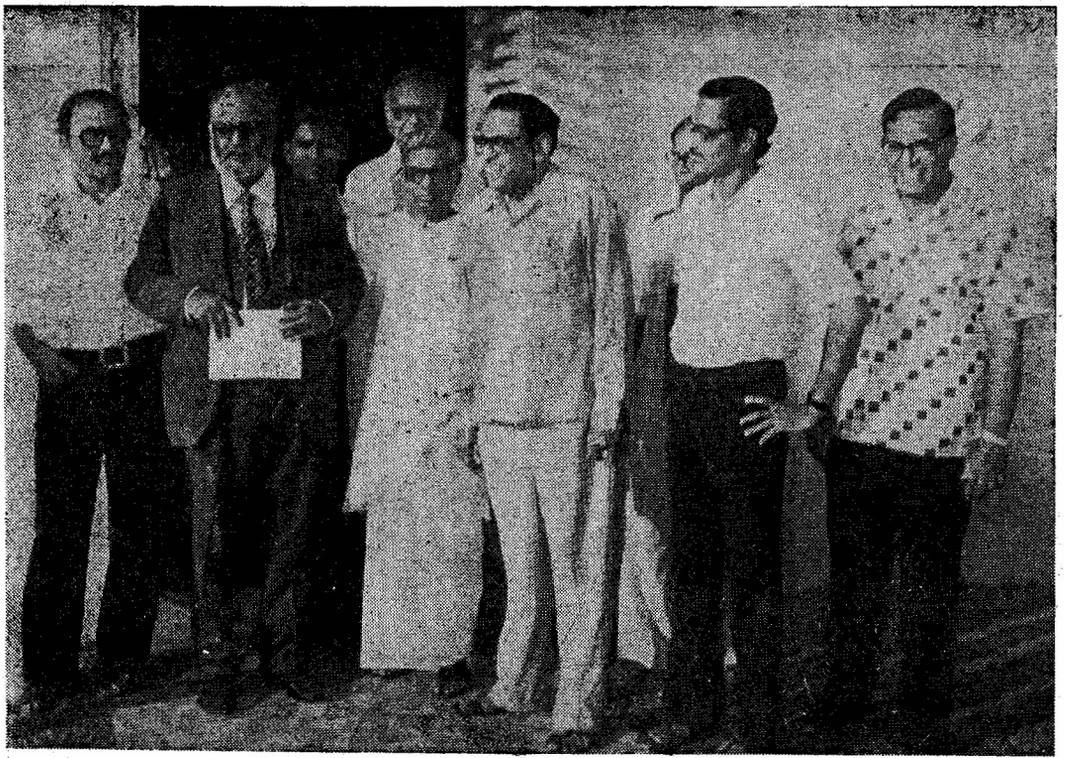
Dr. R. P. Agarwal is spending a year at Consiglio Nazionale Della Recerche, Florence, Italy as a visiting professor.

Dr. R. Jagannathan participated in the Sixth International Conference on Mathematical Physics held at West Berlin and lectured at the Technical University of Clausthal at West Germany during August 1981. He was also a visiting scientist for a month at the International Centre for Theoretical Physics, Trieste, Italy.

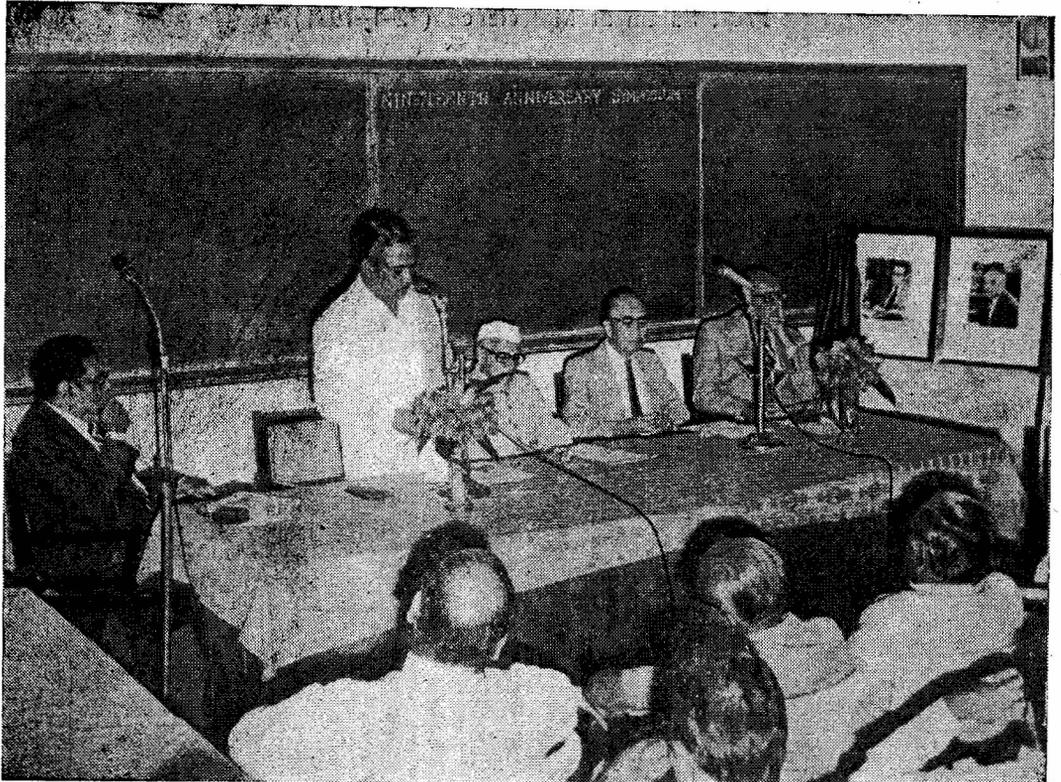


Prof. Salam at Matscience (12-1-1981)



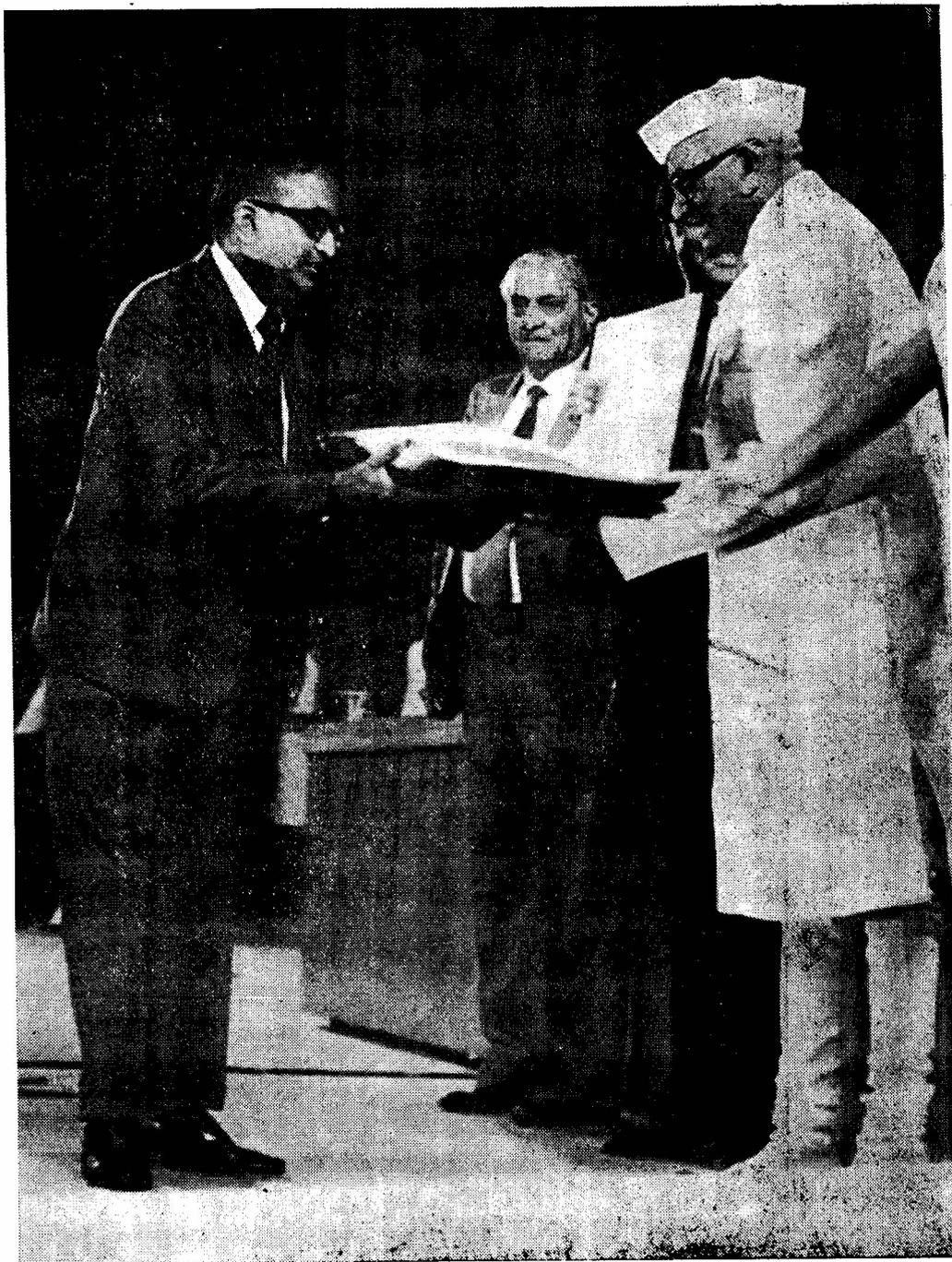


Prof. Salam with the members of the faculty (12-1-1981)



Hon'ble Mr. C. Aranganayakam delivering the Nineteenth Anniversary Address (17-1-1981)

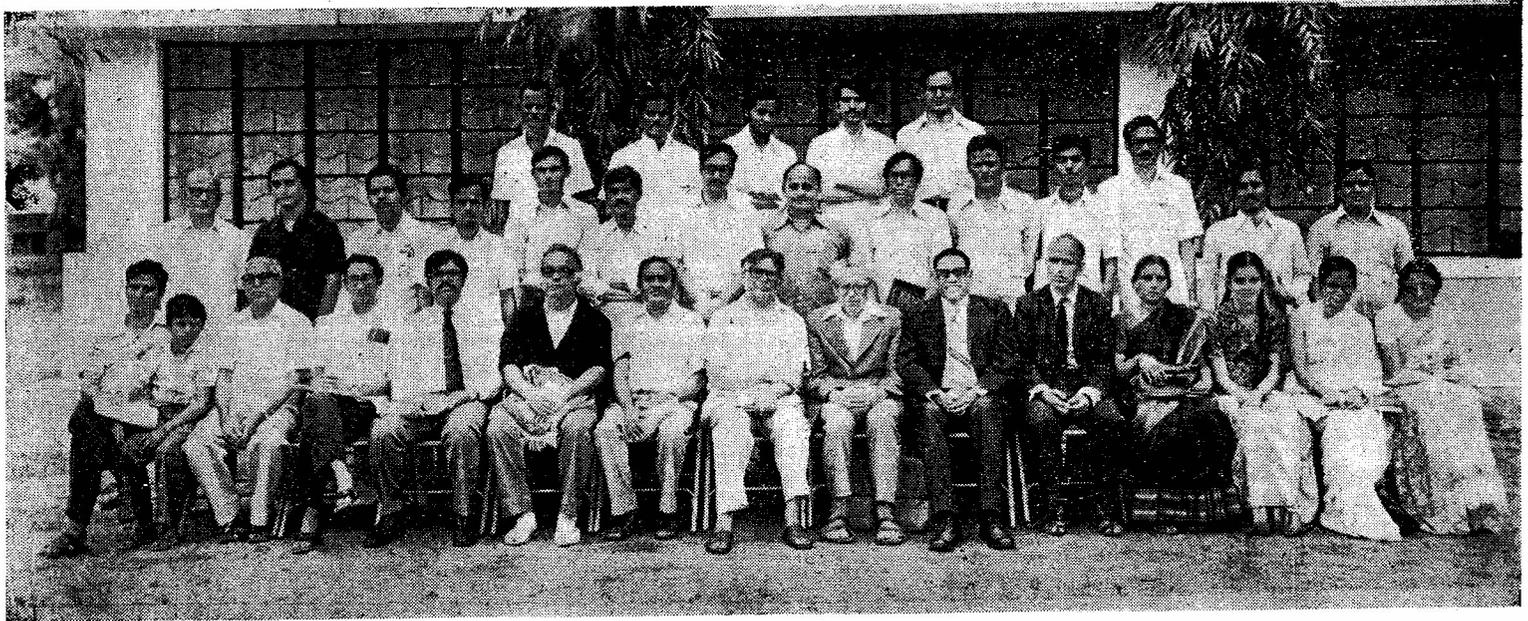
1980 FICCI Award to Prof. Alladi Ramakrishnan for outstanding contributions to
Mathematical Sciences



Prof. N. R. Ranganathan receives the award from the President of India
on behalf of Prof. Alladi Ramakrishnan (25-4-1981)



**Participants of the Matscience Conference on "Particle Interactions and Astrophysics"
held at Mysore (February 1981)**



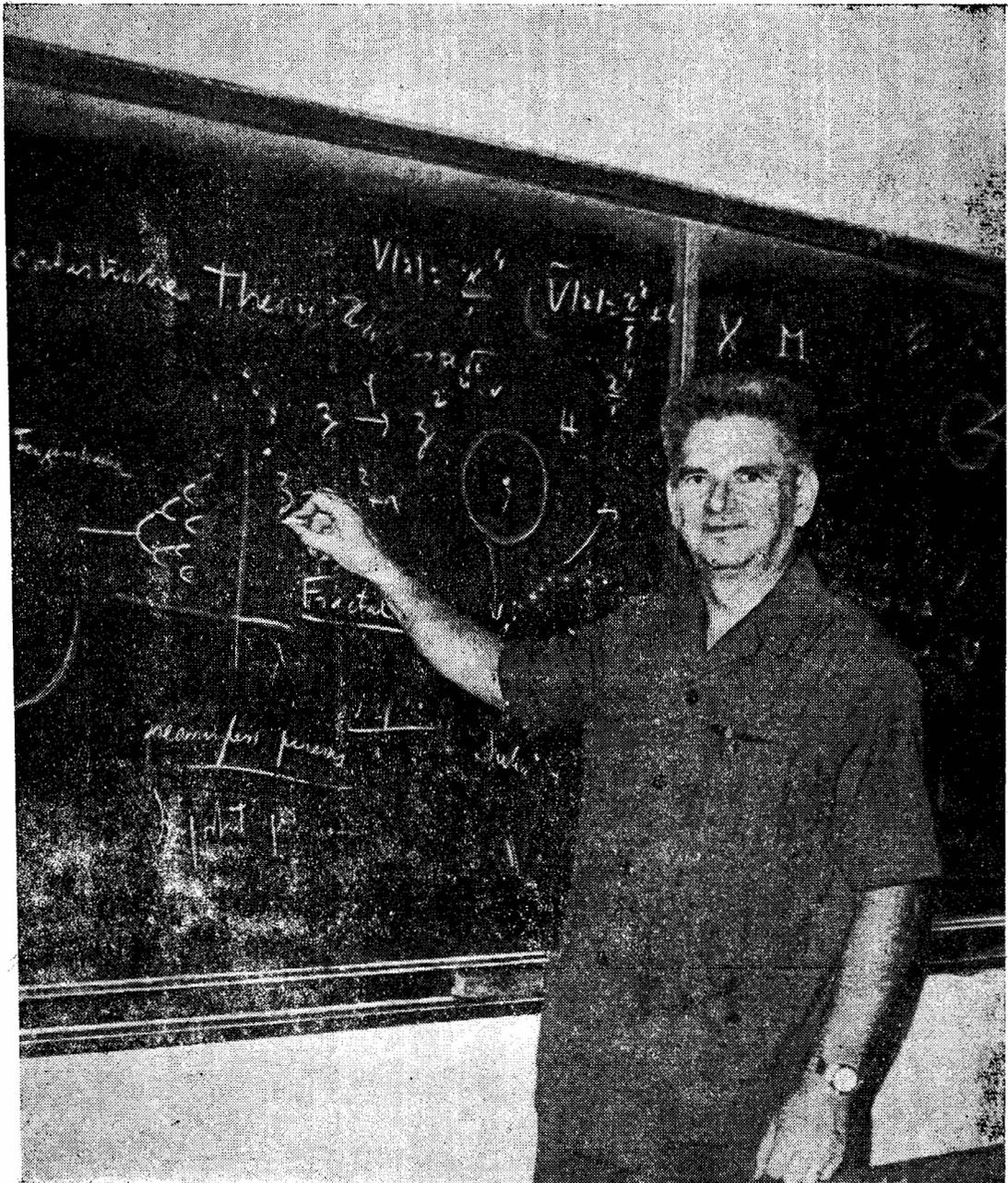
**Participants of the Third Matscience Conference on "Number Theory"
held at Mysore (June 1981)**



Prof. Paul Erdos addressing the gathering at Matscience (1-6-1981)



Prof. L. Cesari at Matscience (29-12-1981)



Prof. Rene Thom lectures on 'Catastrophe Theory' (21-22, December 1981)



Prof. George E. Andrews discussing the contents of

$$\begin{aligned}
 & \text{I } (1-q^2)(1-q^4)(1-q^6) \left\{ 1 + q \cdot \frac{1-2q^5}{1-q} + q^2 \frac{(1-2q^9)(1-2q^3)}{(1-q)(1-q^2)} \right. \\
 \text{A.2} & = (1-2q^4)(1-2q^8) \dots \left\{ 1 + q^4 \frac{1-2q^8}{(1-q^2)(1-q^4)} + q^{16} \frac{(1-2q^{12})(1-2q^4)}{(1-q^2)(1-q^4)} \right. \\
 & \quad \left. + (1-2q^8)(1-2q^{16}) \dots \left\{ \frac{q}{1-q^2} + q^9 \frac{1-2q^4}{(1-q^2)(1-q^4)(1-q^6)} \right. \right. \\
 & \quad \left. \left. + q^{21} \frac{(1-2q^4)(1-2q^8)}{(1-q^2)(1-q^4)(1-q^6)(1-q^8)(1-q^{10})} + \dots \right\} \right. \\
 & \text{II } (1-q^2)(1-q^4)(1-q^6) \left\{ q + q^3 \frac{1-2q^5}{1-q} + q^6 \frac{(1-2q^9)(1-2q^3)}{(1-q)(1-q^2)} \right. \\
 \text{A.3} & = (1-2q^4)(1-2q^8) \dots \left\{ q + q^3 \frac{1-2q^5}{(1-q)(1-q^2)} + q^6 \frac{(1-2q^9)(1-2q^3)}{(1-q)(1-q^2)} \right. \\
 & \quad \left. + (1-2q^4)(1-2q^8) \dots \left\{ \frac{q^4}{1-q^2} + q^{16} \frac{1-2q^4}{(1-q^2)(1-q^4)(1-q^6)} \right. \right. \\
 & \quad \left. \left. + q^{36} \frac{(1-2q^4)(1-2q^8)}{(1-q^2)(1-q^4)(1-q^6)(1-q^8)(1-q^{10})} + \dots \right\} \right. \\
 & \text{III. } (1-q)(1-q^3)(1-q^5) \left\{ 1 - q^2 \frac{(1-2q)(1-2q^3)}{1-q^2} + \dots \right. \\
 & \quad \left. q^6 \frac{(1-2q)(1-2q^3)(1-2q^5)(1-2q^7)}{(1-q^2)(1-q^4)} - \dots \right\}
 \end{aligned}$$

List of Publications

Alladi Ramakrishnan

1. A new concept in probability theory
(J. Math. Anal. Appl., 83, 408, 1981)
2. Duality in stochastic processes
(J. Math. Anal. Appl., 84, 428, 1981)
3. New concepts in probability theory
(Proc. Tamil Nadu Acad. Sci., 4, 207, 1981)
4. Further unnoticed symmetries in special relativity
(To appear in J. Math. Anal. Appl.)

R. Vasudevan

1. Path integral method for radiation transport in a random medium
(Matscience Report 105, 241, 1981)
2. Scaling hypothesis and phase transitions
(Matscience Report 103, 1, 1981)
3. ——— (with P. R. Vittal and A. Vijayakumar)
Neuronal spike trains with exponential decay
(Neurological Research, 3, 139, 1981)
4. ——— (with P. R. Vittal)
Interspike Interval density of the leaky integrator model neuron with a preto
distribution of PSP amplitudes and with simulation of refractory time.
(To appear in J. Theor. Neurobiology)
5. ——— (with R. Sridhar)
A new equation for the structure factor of super fluid ^4He
(To appear in Acta Physica Polonica)

K. R. Unni

1. ——— (with K. Sivasubramanian)
On the space of functions whose n -th differences satisfy Lipschitz condition
(Math. Rep. 4, 7, 1981)

2. ——— (with C. Puttamadaiah)
On orthogonality in S.I.P. spaces
(Tsukuba J. Maths., 5, 15, 1981)
3. ——— (with C. Puttamadaiah)
Some remarks on strictly convex semi-inner product spaces
(To appear in Bull. Calcutta Math. Soc.)
4. ——— (with Q. I. Rahman and K. Sivasubramanian)
Lacunary interpolation for entire functions
(To appear in J. Math. Anal. Appl.)

T. S. Santhanam

1. Are the nucleons composites of only three valence quarks?
(Proc. Tamil Nadu Acad. Sci., 4, 21, 1981)
2. Quantum mechanics in finite space
(To appear in Physica)
3. ——— (with R. Jagannathan)
Finite dimensional quantum mechanics of a particle - II
(To appear in Int. J. Theor. Phys.)
4. ——— (with R. Jagannathan)
On a number theoretical problem involved in the study of the physics of spin systems
(To appear in the Proc. of the Third Matscience Conf. on Number Theory to be published by Springer-Verlag, West Germany)

K. H. Mariwalla

1. Uniqueness of classical and relativistic systems
(Phys. Letts., 79A, 143, 1980)
2. Two remarks on relativistic theories
(Proc. Tamil Nadu Acad. Sci., 4, 29, 1981)
3. Much ado in mechanics
(Phys. Letts., 81A, 444, 1981)

K. Srinivasa Rao

1. Computation of angular momentum coefficients using sets of generalised hypergeometric functions
(Comput. Phys. Commun., 22, 297, 1981)

2. ——— (with S. Susila)
Angular distributions in charged pion photoproduction from ^{12}C and ^{16}O
(Acta Phys. Austriaca, 53, 157, 1981)
3. ——— (with R. Sridhar and S. Susila)
The charge form factor and quadrupole moment of ^6Li
(Physica Scripta 24, 925, 1981)
4. ——— (with S. Susila)
The charge form factor, the quadrupole moment and the photo-
disintegration of ^6Li
(Acta Physica Polonica, B12, 799, 1981)

R. Sridhar

1. ——— (with K. Srinivasa Rao and S. Susila)
The charge form factor and quadrupole moment of ^7Li
(Physica Scripta, 24, 925, 1981)
2. Correlations in liquid helium
(To appear in Proc. Tamil Nadu Acad. Sci. 5, 1, 1982)
3. ——— (with R. Vasudevan)
A new equation for the structure factor of superfluid ^4He
(To appear in Acta Physica Polonica)

R. Parthasarathy

1. High energy physics and nuclear structure
(Proc. Tamil Nadu Acad. Sci., 4, 1, 1981)
2. ——— (with V. N. Sridhar)
Effect of meson exchange corrections in allowed muon capture
(Physics Letts. 106B, 363, 1981)
3. ——— (with Y. K. Gambhir, P. Venkataramaiah and P. Raghavendra Rao)
Microscopic description of total muon capture rates for even isotopes of
Ti, Cr and Fe
(J. Phys. 7G, 333, 1981)
4. ——— (with V. N. Sridhar)
Gamma-Neutrino angular correlations in polarized muon capture in ^{28}Si -
Part II
(Phys. Rev. 23C, 861, 1981)

Krishnaswami Alladi

1. Irrationality estimates using Legendre polynomials
(Matscience Report 104, 1, 1981)
2. Asymptotic estimates of sums involving the Moebius function
(To appear in J. Number Theory)
3. Asymptotic estimates of sums involving the Moebius functions II
(To appear in Trans. American Math. Society)
4. Distribution of $v(n)$ in the sieve of Eratosthenes
(To appear in Quart. J. Maths. Oxford)
5. On the probability that n and $\Omega(n)$ are relatively prime
(To appear in Fibonacci Quarterly)
6. Additive functions and special sets of integers
(To appear in the Proc. of the Third Matscience Conf. on Number Theory to be published by Springer-Verlag, West Germany)

R. P. Agarwal

1. Boundary value problems for higher order differential equations
(Bull. Inst. Maths., Acad. Sinica, 9, 47, 1981)
2. Boundary value problems for differential equations with deviating arguments
(Bull. Inst. Maths., Acad. Sinica, 9, 63, 1981)
3. ——— (with E. Thandapani)
On discrete generalizations of Gronwall's inequality
(Bull. Inst. Maths., Acad. Sinica, 9, 235, 1981)

R. Jagannathan

1. ——— (with V. A. Chinnappan and G. A. Savari Raj)
On the isotopic invariants of polyatomic molecules
(Indian J. Pure and Appl. Phys., 18, 964, 1980)
2. On the use of matrix methods in certain number theoretical problems
(Matscience Report 104, 131, 1981)
3. A note on the use of mathematical techniques of comparison of shapes in forensic science
(Matscience Report 105, 39, 1981)

4. Dynamics of Bloch electrons in a homogeneous magnetic field - a pseudopotential formalism
(Proc. Tamil Nadu Acad. Sci., 5, 31, 1982)
5. ——— (with T. S. Santhanam)
Finite dimensional quantum mechanics of a particle - II
(To appear in Int. J. Theor. Phys.,)
6. ——— (with T. S. Santhanam)
On a number theoretical problem involved in the study of the physics of spin systems
(To appear in the Proc. of the Third Matscience Conf. on Number Theory to be published by Springer-Verlag, West Germany)

V. N. Sridhar

1. ——— (with R. Parthasarathy)
Effect of meson exchange corrections in allowed muon capture
(Phys. Letts., 106B, 363, 1981)
2. ——— (with R. Parthasarathy)
Gamma-Neutrino angular correlations in polarized muon capture in ^{28}Si —
Part II
(Phys. Rev. 23C, 861, 1981)

S. N. Uma

1. Representations of a pair of para-Bose operators using graded Lie algebraic method
(Physica Scripta, 24, 938, 1981)

Prem Kumar Yesudian

1. Construction of tangents
(To appear in Math. Gazette)
2. A new decay mode for nuclear levels
(To appear in Proc. Tamil Nadu Acad. Sci.,)

Invited Lectures

<p>Professor O Costa de Beauregard Faculte des Sciences, Physique Theorique, Institut Henri Poincare Paris</p>	<p>“CPT-invariance and the EPR correlations”</p>	<p>January</p>
<p>Professor M. Gourdin Universite de Paris Paris</p>	<p>“Recent developments in high energy physics”</p>	<p>„</p>
<p>Professor Gunther von Gehlen Department of Physics University of Bonn West Germany</p>	<p>i) Testing QCD in $e^+ e^-$ - jet - production</p> <p>ii) Results from PETRA and prospects for LEP (General Survey)</p>	<p>„</p>
<p>Professor K. Dietz Physikalisches Institut der Universität Bonn West Germany</p>	<p>“Functional integration tech- niques in quantum field theory and statistical mechanics”</p>	<p>February</p>
<p>Professor C. J. Eliezer Department of Applied Mathematics La Trobe University Bundoora, Victoria, Australia</p>	<p>“Elementary introduction to selected topics in Lie symme- tries”</p>	<p>„</p>
<p>Professor Y. Motohashi Department of Mathematics College of Science & Technology Nihon University, Japan</p>	<p>“Latest developments in Sieve methods”</p>	<p>„</p>
<p>Professor S. M. Shah Department of Statistics Sardar Patel University Vallabh Vidya Nagar, Gujarat</p>	<p>“Modified power series distri- bution”</p>	<p>March</p>
<p>Professor N. Mukunda Center for Theoretical Studies Indian Institute of Science Bangalore</p>	<p>i) “Problems of interactions of relativistic particles”</p> <p>ii) “New Dirac equations and electromagnetic interactions”</p>	<p>„</p>

	iii) "Lagrangian description of Regge trajectories"	March
Professor J. Pasupathi Indian Institute of Science Bangalore	"Quark confinement"	"
Dr. N. Balasubramanian Director, Joint Cipher Bureau New Delhi	"Mathematics and cryptology"	April
Professor F. Tcheremissine USSR Academy of Sciences Moscow, USSR	"Numerical methods in kinetic theory of gases"	"
Dr. D. V. Gopinath Safety Research Laboratory Reactor Research Center Department of Atomic Energy Kalpakkam	"New approach to radiative transport"	"
Dr. Krishnaswami Alladi Department of Mathematics University of Michigan, USA	"Probabilistic number theory - distribution of additive functions"	May
Professor Paul Erdos Mathematical Institute of the Hungarian Academy of Sciences Budapest, Hungary	"Probabilistic number theory"	June
Professor D. Chatterji Visva - Bharathi University Santiniketan, Calcutta	"Collisional de - excitation of excited sodium atomic states"	"
Professor M. V. Subbarao Department of Mathematics University of Alberta Edmonton, Canada	"Rogers-Ramanujan Identities and generalisations"	September
Professor George E. Andrews Pennsylvania State University USA	"Topics in number theory"	October
Dr. S. G. Kamath Department of Physics & Astro - Physics, University of Delhi, Delhi	"Penguins and weak decays"	"

Professor Paul Nelson
Department of Mathematics
Texas Tech. University
USA

i) "Recent computational
progress in invariant
imbedding"

October

ii) "Solution of singular
two - point boundary -
value problems by invari-
ant imbedding"

„

Professor Rene' Thom
Institut Hautes Etudes Scientifiques
Paris, France

"Bifurcations, attractors and
singular perturbation theory"

December

Professor L. Cesari
Department of Mathematics
University of Michigan, Ann Arbor
USA

i) "A mathematical formu-
lation of the problem of
duplication of frequency
with laser light"

„

ii) "Periodic solutions of non-
linear differential equations :
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