Annual Report for the year 2000-2001

About the Department

The Department of Mathematics comprises of 25 faculty members with expertise in various areas of Mathematics, Statistics and Theoretical Computer Science. The faculty members strive to maintain high standards in teaching and research. During the year under review, three of the faculty members were receipients of the following awards: Best Young Mathematician award by the Indian Society of Industrial and Applied Mathematics, C.L.Chandana Award for Distinguished and Outstanding contributions to Mathematics Teaching and Research in India for the year 2000 and IIT, Bombay Excellence in Teaching award for the year 2000, respectively.

There is an active collaboration between the Department and various leading Indian and Foreign Institutes. Some of the Faculty members are also interacting with the Industry. The Department hosted an International conference, and many Seminars were organised during the year. Many faculty members were also involved in organising Workshops, CEP Programmes, participating in national/international conferences, and writing of books and monographs. They

also carried out significant honorary work like editorial and referee jobs for journals, reviewing of projects sponsored by national agencies, examining of theses and serving on selection committees of various Universities and Institutes.

Academic Programmes

The Department offers core courses in Mathematics to B. Tech. programmes. It runs two distinct M. Sc. programmes: i) M. Sc. in Mathematics for those who intend to take up research and/or teaching as their career, ii) M. Sc. in Applied Statistics and Informatics (ASI) for those who wish to take up professions which require skills and techniques of Mathematics, Statistics and Informatics.

In addition, the Department has a research programme leading to Ph.D. degree. This programme has a broad based course work and specialization in many areas of Pure Mathematics, Applied Mathematics, Statistics and Scientific Computing.

Student Intake

Ph. D. : 7
M. Sc. (Mathematics) : 18
M. Sc. (ASI) : 25
Degrees awarded
Ph. D. : 03
M. Sc. (Mathematics) : 10
M. Sc. (ASI) : 13

Extension Activities

On behalf of "Bombay Mathematical Colloquium" and "Mathematics Association of IIT, Bombay" Professor J. K. Verma organized "Popular Lecture Series in Mathematics" for the 4th consecutive year. The following lectures were held during the academic year 2000 - 2001.

1.A. R. Shastri, Department of Mathematics, IIT, Bombay
Topology of Surfaces,

2.Ketan Mulmule, Department of Computer Science, IIT, Bombay
Algebra and Geometry in Complexity

3.U. A. Yajnik, Department of Physics, IIT, Bombay
Fundamental Interactions and Geometry

4.S. S. Abhyankar, Purdue University, USA
Roots of Algebraic Geometry

5.R. R. Simha, Department of Mathematics, University of Mumbai
Perimeter of Ellipse and Beyond

6.B. V. Limaye, Department of Mathematics, IIT, Bombay
Ancient Indian Mathematics

7.M. S. Raghunathan, TIFR, Mumbai
Geometry and Arithmetic in SL(2, R)

R and D Activities

The current research interest in the Department covers a wide range of fields:

Algebra, Combinatorics, Algebraic Geometry, Differential Geometry, Algebraic Topology, Functional Analysis, Harmonic Analysis, Set-Valued Analysis, Approximation Theory, Nonlinear Analysis, Partial Differential Equations, Nonlinear waves, Numerical Analysis, Tribology, Mechanics of Solids, Fluid Mechanics, Magnetohydrodynamics, Biomechanics, Non-Newtonian Fluid Flow, Statistical Inference, Geostatistics, Reliability Theory, Industrial Mathematics and Statistics, Combinatorial Optimization, Algorithms, Computational Biology and Biostatistics, Bio-informatics.

More specifically, the faculty members are currently pursuing research in the following areas.

Hilbert polynomials, Cohen-Macaulay property of fiber cones, local cohomology, mixed multiplicities.

Subintegrality, invertible modules, Hilbert functions and polynomials of local and graded rings. Investigation of subintegrality and invertible modules; the relationship between Hilbert coefficients and depths of form rings.

Grassmannians and Schubert varieties, Determinantal and pfaffian rings and their Hilbert functions, MDS Codes and Codes associated to higher dimensional varieties, Counting the number of points of varieties over finite fields.

Harmonic manifolds, Classification of noncompact Harmonic manifolds with minimal horo-spheres.

Eigenvalue Problems for large full matrices, Refinement and Acceleration of approximate eigenevalues, eigenvectors and spectral subspaces of Integral and Differential Operators.

Vector valued functions, Analysis of vector-valued Mean Periodic Functions and their Applications.

Stability and well-posedness in Optimization and Approximation.

Development of a common platform for parameter estimation for Data Reconciliation , Neural Network and Electrical Power System, based on nonlinear analysis and contol and optimization theory.

Development of efficient, robust and reliable numerical approximations to real world problems.

Finite Element Approximations to Partial Integro-Differential Equations, Evolutionary Variational Inequalities, Viscoelastic Fluid Flow Problems, Alternate Mixed Methods and Numerical Methods for Particle Size Distributions in Emulsion Polymeriz- ation Process.

Hyperbolic Systems Of Conservation Laws. Analysis of the transport equations governing the asymptotic behaviour of highly oscillatory solutions of the Lundquist eqations in Magnetohydro- dynamics.

Asymptotic solutions of nonlinear hyperbolic systems and stability.

Search for approximate analytical solutions using nonlinear geometrical optics approach.

Magnetic Fluids, Blood Flow.

Combinatorial Optimization, Algorithms for VLSI CAD, Computer Aided Geometric Design.

Algebraic and Enumerative Combinatorics.

Artificial Neural Networks for Molecular Recognition, Nonparametric Statistical and AI Methods for Protein Engineering, Artificial Immune Systems.

Development of Nonparametric Regression and Knowledge Based Algorithm for ab-initio Prediction of Protein Structure.

Development of ANN based AI Software for epitope/paratope designing.
Understanding Autoimmunity by Artificial Immune System Modelling.

Projects and Consultancies

Combinatorial and Computational Methods in Algebraic Geometry, AICTE, Delhi.

Combinatorial and Computational Aspects of Some Algebraic Varieties, Industrial Research and Consultancy Centre, IIT Bombay.

Doing Industrial Mathematics via Genetic Algorithms, Differential and Algebraic Equations , On-line Optmization , Computer Aided Geometric Design and Market Forecasting, Department of Science & Technology.

Effect of Megnetic field on blood flow with blood as a two-phase

Design, estimation and software development of single and double

Neural Network Based AI Software Development for Epitope/Paratope Designing, Department of Biotechnology, Government of India.

Identification of successful Business Practices of Indian Exporting Firms, A. F. Fergusson and Co., Mumbai.

Village India-Identification and Enhancement of Cultural Heritage - A Statistical Analysis, Indira Gandhi National Centre for the Arts, New Delhi.

Failure Data Analysis, Mahindra and Mahindra Ltd., Tractor Division, Mumbai.

Sponsored Projects

Ongoing : 06
Sanctioned outlay : 50.89 lakhs
Faculty involved : 08
Consulting jobs : 04
Income generated : 1,66,850

Collaboration

There has been an active interaction between the Department and a number of leading institutes such as : Institut fur Mathematik der Universitat Wien Vienna, Austria, Federal Univ. Parana, Brazil, Queen's University, Kingston, Canada, University of Tsukuba, Japan, Institut de Mathematiques de Luminy, Marseille, France, Univ. Jean Monnet, St Etienne, France, Seoul National University, Korea, Institute for Information Transmission Problems Moscow, Russia, Colorado School of Mines, Golden, USA, I. B. M. Research Center,USA, Chennai Mathematical Institute, Institute of Mathematical Sciences, Jamia Millia Islamia University, New Delhi, Rajasthan University, Jaipur Tata Institute of Fundamental Research, Mumbai, VRCE, Nagpur, NSTI, New Delhi.

Visitors

During the academic year 2000 - 2001 the following persons visited the Department and gave seminar talks:

Mrinal Ghosh, IISc, Bangalore,
Gilles Lachaud, Institut de Mathematiques de Luminy, France,
C. Rabut, INSA, Toulouse, France,
G. S. Ladde, University of Texas, Arlington, USA,
Graeme Fairweather, Colorado School of Mines, USA,
Peter Zvengrowski, University of Calgary, Canada,
Vaidyanathan Sundarapandian, IIT, Kanpur
Ganesh Sundaram, Bell Labs, New Jersey, USA.

Workshops

Balwant Singh

Member of the organizing committee for a Winter School and International Conference on Cohomological Methods in Commutative Algebra held at Mumbai from Nov 27 to Dec 16, 2000.

A. K. Pani

Resource Person in the `International Workshop on Analysis and Applications', held in Chiangmai University, Chiangmai from 15th to 17th May'2000.

Member of the Organising Committee for the International Conference on `Nonlinear Systems : Modeling, Simulation and Applications', held in NES College, Nanded during 26th Dec. to 29th Dec. 2000.

I. K. Rana

organised the 7th Workshop in Mathematics for final year BA/BSc students form Maharashtra region. The Workshop was sponsored by DST.

S. B. Patkar

coordinated a 5-day CEP course on Java 2 Standard Edition conducted for Zee Interactive Learning Systems.

S. V. Sabnis

organised an `International Conference on Statistics, Combinatorics and Related Areas' jointly with the Forum for Interdisciplinary Mathematics, USA during 19 - 21 December 2000.
conducted a two-day in-house CEP workshop on 'Industrial Statistics' at the premises of Sterlite Copper company during 22-23 July 2000.

J. K. Verma

was convener of Winter School and International conference on `Cohomological Methods in Commutative Algebra' which was funded by NBHM and International Mathematical Union

Awards and Honours

A. K. Pani
Best Young Mathematician Award by the Indian Society of Industrial and Applied Mathematics for outstanding contributions in Numerical Analysis, Partial Differential Equations and Industrial Mathematics.

I. K. Rana
C.L.Chandana - 2000 Mathematics Award for Distinguished and Outstanding

contributions to Mathematics Teaching and Research.

D. V. Pai
Best Teacher Award for Excellence in Teaching for the year 2000 by IIT Bombay.

Publications

a) Books/Chapters in Books

B. V. Limaye (with M. Ahues and A. Largillier)
Spectral Computations of Bounded Operators, Chapman and Hall/CRC, Boca Raton, USA, 2001.

D. V. Pai (with Hrushikesh N. Mhaskar)
Fundamentals of Approximation Theory, Narosa Publishing House, New Delhi, 2000, Co-published: CRC Press, Boca Raton, USA, 2000 and Alpha Science International, Pangbourne, UK, 2000.

Papers in Journals

International

Balwant Singh
Weak subintegrality and invertible modules in graded rings, Journal of Algebra, vol 237 (2001), pp. 657-672.

P. Chaturani (with A. K. Sahu, M. N. Mathur and S. Saxena)
Momentum and heat transfer from a continuous moving surface to a power law fluid, Acta Mechanica, 142 (2000), pp. 119-131.

K. D. Joshi
Mistake in Hirsch's Proof of Brouwer Fixed Point Theorem, Proc. Amer. Math. Soc., vol. 128, No.5,(2000), pp. 1523-1525.

R. R. Joshi (with S. Jyothi)
Protein Structure Determination by Nonparametric Regression and Knowledge Based Constraints, Computers & Chemistry Vol. 25 (3), (2000), pp. 281-297.

3D-Structure of Human Seminal Plasma Prostatic Inhibin by Nonparametric Regression, Protein Peptide Letters Vol. 7 (3), (2000), pp. 167-174.

R. P. Kulkarni (with R. Alam and B. V. Limaye)
Accelerated Spectral Refinement, Part 1: Simple Eigenvalue, J. Austral. Math. Soc. (series B), 41 (2000), pp.487-507.
Accelerated Spectral Refinement, Part 2: Cluster of Eigenvalues, ANZIAM J. 42 (2000), pp.224-243.

B. V. Limaye (with S. H. Kulkarni)
Boundaries and Choquet sets for real subspaces of C(X), Math. Japonica, 51(2000), pp. 199-212.
D. V. Pai (with B. M. Deshpande)

On Hypertopologies and the Young-Fenchel Transform, Numer. Funct. Anal. Optim. 21 (2000), 7-8, pp. 885-900.
A. K. Pani (with Jin Yun Yuan)

Mixed finite element method for the strongly damped wave equationa, Numer. Meth. PDE,17 (2001), pp.105-119
(with Rajen K. Sinha)
Error estimates for semidiscrete Galerkin method for time dependent parabolic integro-differential equations with nonsmooth data, CALCOLO: A Quarterly on Numerical Analysis and Theory of Computation, Springer Verlag Publ., 37 (2000), pp. 181-205.
Finite element approximations with quadrature to a time dependent parabolic integro differential equations with non smooth data, Journal of Integral Equations and Applications, Vol. 13, No.1 (2001), pp. 35-72.

Patkar, S. (with Fujishige, S.)
Realization of set functions as cut functions on graphs and hypergraphs, Discrete Mathematics, (2001) 226, pp. 199-210, .

J. Prakash (with K. Gururajan)
Effect of Surface Roughness in a Narrow Porous Journal Bearing, ASME Journal

of Triblogy, Vol. 122, (2000), pp. 472-474

S. V. Sabnis (with Mini N. Balu)
A note on Preservation of Unimodality under Homogenous Poisson Shock Models, Metron, Vol. LVII, no. 3-4 (1999), pp. 203-209.

V.D. Sharma (with J.Jena)
Self similar shocks in a dusty gas, International Journal of Nonlinear Mechanics (USA), Vol.34, (1999), pp. 313-327.

A. Subramanyam (with N. R. Sahoo and H. S. Pandalai)
Secondary geochemical dispersion in the Precambrian auriferous Hutti-Maski schist belt, Raichur district, Karnataka, India, Part 2, Application of factorial design in the analysis of secondary dispersion of As, J. of Geochemical Exploration, 71(2000), pp. 291-303.

M. K. Srinivasan (with R. S. Deodhar)
Explicit semisymmetric chain decomposition of the partition lattice, Discrete Mathematics, 219(2000), pp. 259-264.

Verma, J. K. (with D'Cruz, Clare)
On the number of generators of Cohen-Macaulay ideals, Proc. Amer. Math. Soc. 128 (2000), no. 11, pp.3185-3190.

National

P. Chaturani (with S. Saxena Bharatiya)
Two-layered Magnetohydradynamic model of parallel plate hemodialyser, Indian J. of Pure and Appl. Maths., 32 (2001), pp. 55-68.

S. R. Ghorapade
Discriminants in Algebra and Arithmetic, Bona Mathematica, Vol. 11 No. 2-3 (2000), pp. 43-62.

Papers in Proceedings

International

S. R. Ghorapade
A Note on Hodge's Postulation Formula for Schubert Varieties, in: Geometric and Combinatorial Aspects of Commutative Algebra, (Eds., J. Herzog and G. Restuccia), pp. 211--220, Lecture Notes in Pure and Applied Mathematics, Vol. 217, Marcel Dekker, New York, 2001.

Patkar, S. (with Narayanan, H.)
Fast On-line/Off-line Algorithms for Optimal Reinforcement of a Network and its Connections with Principal Partition, in Proc. of ann. Conf. on Foundations of Software Technology and Theoretical Computer Science, (FST TCS-20), Lecture Notes in Computer Science - 1974, Springer, India, 2000, pp. 94-105.

National

P. Chaturani (with J. Toravi, A. M. Patwardhan, S. Saxena Bharatiya and S. K. Pathak)
In-vivo measurement of pressure gradient profiles of blood flow in human thracic aorta, 27th National Conference on FMFP, 2000, pp. 369-378.
(with J. Toravi and S. Saxena Bharatiya)
Two-layered Two-phase magnetic fluid model for blood flow through a circular tube hemodialyser, Proc. Math. Anal. Appl., 2000, pp. 185-189.

Presentation/Participation in Conferences/Workshops

Balwant Singh
1. participated in the Third National Discussion Meeting on Commutative Algebra and Algebraic Geometry held at Bangalore from Oct 16 to 21, 2000.
2. participated and lectured in a Winter School and Inter- national Conference on Cohomological Methods in Commutative Algebra held at Mumbai from Nov 27 to Dec 16, 2000.

P. Chaturani
1. delivered an Invited lecture on pulsatile flow of blood with external excitations in the 45th Congress of ISTAM, Dec. 2000
2. participated in project monitoring workshop of Extramural Research Schemes

of Mathematical Sciences organised by CSIR, New Delhi on 27th Feb 2001.

S. R. Ghorapade
1. Rings of invariants and constant term identities, Workshop on Computational and Combinatorial Aspects of Commutative Algebra, Universitat GH Essen, Essen, Germany, May 2000
2. Hyperplane sections of Grassmannians, with applications, Conference on Algebra and Algebraic Geometry with Applications (in honour of Prof. Shreeram Abhyankar's 70-th Birthday), Purdue University, West Lafayette, USA, July 2000.
3. Poincare polynomials and the number of solutions of equations over finite fields, International Conference on Number Theory and Discrete Mathematics (in Honor of Srinivasa Ramanujan), Panjab University, Chandigarh, October 2000.
4. Hilbert series of ladder determinantal rings, Third National Discussion Meeting on Commutative Algebra and Algebraic Geometry, Indian Institute of Science, Bangalore, October 2000.
5. Teaching Calculus using Intac: Some Experiments and Experiences, CASTME-UNESCO-HBCSE International Conference on Science, Technology and Mathematics Education for Human Development, Goa, February 2001.
6. Polynomial congruences, Geometry and Topology, Conference on Number Theory, The Institute of Science, Mumbai, February 2001.
7. School on Vanishing Theorems and Effective Methods in Algebraic Geometry, directed by J.-P. Demailly and R. Lazarsfeld, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, April--May 2000.

M. C. Joshi
1. organized a special session on " Industrial Mathematics " at the World Congress of Nonlinear Analysts, University of Catania, Italy- July 2000.
2. gave one hour invited lecture at the World Congress of Nonlinear Analysts at Catania , Italy on various aspects of the sponsored project on Industrial Mathematics currently in progress at IIT Bombay.

K. D. Joshi
participated in a Workshop at Babasaheb Ambedkar Marathwada University, Aurangabad in December 2000

S. B. Patkar

1. presented a research paper (coauthored with H.Narayanan) on Improving Graph Partitions using Submodular Functions at International Symposium on Mathematical Programming, Atlanta, Georgia, Aug. 2000.
2. presented a research paper (coauthored with H.Narayanan) entitled Fast On-line/Off-line Algorithms for Optimal Reinforcement of a Network and its Connections with Principal Partition at the Annual International Conf. on Foundations of Software Technology and Theoretical Computer Science, (FST TCS-20), New Delhi, December 2000.

S. V. Sabnis

gave an invited talk entitled Identification of Successful Business Practices in Indian Exporting Firms at xxth Annual Conference of Indian Society for Probability and Statistics and National Seminar on Industries Oriented Statistical Reserach, Pt. Ravishankar Shukla University, Raipur, Feb 19-21, 2001

A. R. Shastri

attended the International Instructional Conference on Low Dimensional Topology, at Allahabad, organised by Harischandra Research Institute and Department of mathematics, University of Allahabad, during 19th Dec. to 30 Dec. 2000. He also gave lectures on the use of the PL category and on Plumbing in manifolds.

A. K. Pani

1. organised a session on Computational Mathematics in the International Conference on Nonlinear Systems : Modeling, Simulation and Applications, held in NES College, Nanded during 26th Dec. to 29th Dec. 2000.
2. organised a special session on New Challenges in Mathematical Education in the International Conference on Nonlinear Systems: Modeling, Simulation and Applications, held in NES Science College, Nanded during December 26--29, 2000.
3. chaired a session in the International Conference on Analysis and Applications, held in Chiangmai University, Chiangmai from 17th to 18th May, 2000.
4. chaired a whole day session on Partial Differential Equations, in the International Conference on Nonlinear Systems : Modeling, Simulation and

Applications, held in NES College, Nanded during 26th Dec. to 29th Dec., 2000.
5. delivered two and half hours lecture on Finite Element Methods for Elliptic Problems in the International Workshop on Analysis and Application, held in Chiangmai University during 15th to 17th May, 2000
6. delivered 40 minutes invited lecture on An Alternate Mixed Finite Element Method for Evolution Equations in the International Conference on `Analysis and Applications', held in Chiangmai University during 18th to 19th May, 2000.
7. delivered an invited talk entitled An H^1-Galerkin Mixed Method for Heat Equation, in the International Conference on `Applied Nonlinear Analysis 2000', in Pukyong National University, Pusan (South Korea), during 15-16th June, 2000
8. delivered an invited talk entitled Oldroyd Model in Viscoelastic Fluids: Some Theoretical and Computational Issues in the annual meeting of Korean Applied Mathematics Forum, held in Songee Mountain (June 26-28th, 2000).
9. delivered one hour Invited Talk entitled Particle Size Distribution in Emulsion Polymerizations : Some Computational Issues in the session on Applied Analysis and Industrial Mathematics in the Third World Congress on Nonlinear Analysts 2000, held in Univ. Catania (Italy), during 19-26th July, 2000.
10.delivered one hour invited talk entitled Numerical Simulation of Particle Size Distribution in Emulsion Polymerization Process, in the International Conference on ` Nonlinear Systems : Modeling, Simulation and Applications ', held in NES College, Nanded during 26th Dec. to 29th Dec., 2000.
11.delivered an invited talk entitled Particle Size Distribution in Emulsion Polymerisation - An Industrial Case Study and Its Imact in Mathematical Research, in the International Conference on Industrial and Applied Mathematics in the Indian Subcontinent, held at Amritsar during 22nd to 25th January, 2001.

I. K. Rana
chaired a session in the `Workshop in Mathematics Education' at ICICI Center for Mathematics,St.Stephen's College, University of Delhi in Jan,2001

J. K. Verma
1. delivered an invited talk entitled On two theorem of Macaulay at the 3rd National Discussion meeting in Commutative Algebra and Algebraic Geometry held at I.I.S.c, Bangalore in October, 2000
2. delivered 4 lectures on `Cohen-Macaulay rings' in Winter School on

Cohomological Methods in Commutative Algebra , organized by IIT, Bombay at the Homi Bhabha Centre for Science Education, Mumbai, November 27-December 16, 2000.
3. delivered 13 lectures on `Fundamental theorems of commutative algebra' in NBHM Mathematics Nurture Programme, TIFR, Mumbai, June-July 2000.

P. Vellaisamy
particaipated in the Spring Meeting of the Mathematical Society of Japan, held at Keio University, Tokyo, during March 26- 30, 2001.

Seminars/Colloquium/Invited Lectures

S. R. Ghorapade
delivered the following lectures:
1. On and around Reed-Muller codes, Institut de Mathematiques de Luminy, Marseille, France, May 2000.
2. Old and new inequalities for the number of points of varieties over finite fields, Institut de Mathematiques de Jussieu, Universite Pierre et Marie Curie (Paris 6), Chevaleret, Paris, May 2000.
3. Codes, matroids and hypergraphs with applications to Algebraic Geometry, Mathematisches Kolloquium, Christian-Alberchts Universitaet Kiel, Kiel, Germany, May 2000.
4. Lefschetz Theorems and the number of points of singular varieties over finite fields, Oberseminar Algebra, Geometrie, Zahlentheorie, Universitaet GH Essen, Essen, Germany, May 2000.
5. Error correcting codes, matroids and linear sections of Grassmannians, Mathematischen Kolloquium, Universitaet Osnabruck, Osnabruck, Germany, May 2000.
6. Fermat's Last Theorem and its impact on Mathematics, California State University, Los Angeles, USA, July 2000.
7. Grassmann varieties, matroids and error correcting codes, University of Southern California, Los Angeles, USA, July 2000.
8. Review of Classical Commutative Algebra, A series of two lectures, Winter School on Cohomological Methods in Commutative Algebra (supported by NBHM and IMU), Homi Bhabha Centre for Science Education, Mumbai,

Novermber 2000.
9. Topics in Algebraic Number Theory, A series of ten lectures, Christian Albrechts Universitaet Kiel, Kiel, Germany, December 2000.

K. D. Joshi
delivered invited talk at Karnatak University, Dharwad in December 2000.

R. R. Joshi
1. delivered an invited Seminar on "Artificial Intelligence and Computational Methods in Molecular Immunology" at CBME, IIT Delhi. (June, 2000)
2. delivered an invited lecture series on "Neural Computing and Applications in Molecular Biology/Bioinformatics" at Bioinformatics Center, Pune (16-18 Feb, 2001).

B. V. Limaye
delivered an invited talk on "Spectral Approximation and Computation" at Karnataka University, Dharwad on 12th Jan 2001.

A. K. Pani
1. delivered a series of Lectures on "Parabolic Integro- Differential Equations and Numerical Methods" during June, 2000 in the Department of Mathematics, Seoul National University, Seoul (South Korea).
2. delivered a colloquium talk entitled An alternate mixed method for some evolution equations, Department of Mathematics (14th June'2000), Yonsei University, Seoul (South Korea).
3. delivered a colloquium talk entitled An H^1- mixed method for parabolic problems, Department of Mathematics (19th June 2000), Korean Advanced Institute of Science and Technology, Taejon (South Korea).
4. delivered a colloquium talk entiled A Posteriori Estimate: A Step Towards Adaptive Method, (June 23rd'2000), Department of Mathematical Education, Seoul National University, Seoul (South Korea).
5. delivered a seminar talk entitled An alternate mixed finite element method for parabolic equations, Department of Mathematics, IIT Delhi (19th January, 2001).

S. B. Patkar

1. delivered a colloquium talk entitled Applications of Submodular Functions at University of Iowa, USA, Aug. 2000
2. delivered a 6-hour lecture series on "Network Simplex Method and its Applications", in : UGC Refresher Course on Optimization, Mumbai University

S. V. Sabnis
delivered an invited talk entitled Time Series Modelling, NITIE, 14th March 2001.

A. R. Shastri
1. delivered talks on `Why PL'? and Plumbing,,International Instructional Conference on Low dimensional Topology, University of Allahabad, 19th Dec. to 30 Dec. 2000.
2. delivered an invited lecture entitled Complex Numbers, SDM college Honavar, North Karnataka, Dec 3rd 2000.
3. delivered a series of three lectures entiled Paper folding: a non technical introduction to PL topology, Departement of Mathematics, Karnatak University Dharwar, Dec 4th-6th 2001.

M. K. Srinivasan
delivered 4 lectures on "Linear Programming Duality", UGC refresher course on Optimization at Mumbai University, Feb. 2001.

J. K. Verma
delivered a lecture entitled Sums of squares at Ram Narain Ruia College, Mumbai, September 30, 2000.

P. Vellaisamy
delivered invited lectures in:
(i) Regional conference of Japan Annual Meeting of Mathematical Society held in July 2000 at Osaka Prefecture University, Osaka.
(ii) National Meeting on the Applications of Statistics to Enviornmental Science, (Dec. 2000), Keio University, Tokyo.
(iii) International Meeting on Comprehensive Research in the Theory of Statistics, (February, 2001), Osaka University, Osaka.

(iv) The Institute of Statistical Mathematics (ISM), (in March, 2001) , Tokyo.

Honorary Work

Balwant Singh
participated in several selection committee meetings at IIT's and other institutions.

P. Chaturani
worked as a member of ISTAM best paper award committee

S. R. Ghorapade
is nominated as a Co-opted Member (in the `Eminent Persons' category) on the Board of Studies in Mathematics, University of Mumbai, August 2000.
worked as referee for the Journal of the Indian Academy of Sciences

M. C. Joshi
worked as a referee of Ph.D. Thesis , participated in the Board of Study meetings and Selection Commiitee Meetings in various universities.

R. R. Joshi
worked as a member, National Task Force for Bioinformatics, refereed papers submitted to the international journals "Computers and O.R." and "Neural Processing Letters".

A. K. Pani
was invited to join as a UGC nominee in the Advisory Committee for the UGC-DRS project (stage II) of the Department of Mathematics in the Berhampur University.
participated in the discussion on the course structures on Numerical Analysis and Scientific Computing which would be a part of the applied mathematics curriculum of Chiangmai University Undergraduate and Masters programme in Mathematics;
refereed papers for SIAM J. Numer. Anal., Korean J. Comput and Appl. Math., IMA J. Numer. Anal., Numer. Meth. PDE, Communi- cations in Applied Analysis, J. Computational and Applied Mathematics;

worked as an Associate Editor of Differential Equations and Dynamical Systems: An International Journal for Theory and Applications;
evaluated Ph. D. Thesis : One from Goa Uni., One from Aligarh Muslim Univ;
particiapted in evaluation of on a candidate for the position of a Professor in the Department of Mathematics in the Pohang Institute of Technology, Pusan, Korea.

D. V. Pai
participated in several selection committee meetings at IIT's and other institutions,
conferred with an Honarary Appointment to the Research Board of Advisors of the American Biographical Institute, U. S. A.,
refereed three Research Projects for Department of Science and Technology, Government of India,
refereed Ph. D. these: one for University of Lucknow, one for University of Rewa and one for I. I. T.,Kanpur.,
refereed two research articles for Indian Academy of Sciences.

B. V. Limaye
participated in several selection committee meetings at IIT's and other institutions.

S. B. Patkar
refereed papers for Discrete Applied Mathematics.

J. Prakash
reviewed papers for Zentralblatt fur Mathematik.

A. Ranjan
refereed one paper.

V. D. Sharma
appointed Reviewer for Zentrablatt Math (Germany)
reviewed papers for Math Rev. (USA), examined one M.Phil Thesis from the University of Hyderabad

M. K. Srinivasan
reviewed papers for Maths. Review

J. K. Verma
worked as Convener, "NBHM Nurture programme" for winners of Indian National Mathematical Olympiad Batch 0f 1997.
refereed for papers in "Communications in Algebra". Writer for "Mathematical Reviews".

P. Vellaisamy
reviewed a paper for Journal of Indian Statistical Association.

Faculty and their Specializations

1. Balwant Singh — Commutative Algebra, Algebraic Geometry.

2. Chaturani P. — Fluid Mechanics, Magnetohydrodynamics, Biomechanics, Magnetic Fluids, Blood Flow, Non-Newtonian Fluid Flow

3. S. R. Ghorpade — Algebraic Geometry, Combinatorics

4. Joshi K. D. — Topology, Discrete Mathematics

5. Mohan C. Joshi — Nonlinar Analysis, Control Theory

6. R. R. Joshi — Computational Biology and Biostatistics, Bioinformatics.

7. Rekha P. Kulkarni — Numerical Functional Analysis, Spline Theory

8. Balmohan V. Limaye — Functional Analysis, Numerical Analysis, Spectral Approximation

9. Devidas V. Pai — Functional Analysis, Approximation Theory, Set-valued Analysis

10. Amiya K. Pani Numerical Analysis
Partial Differential Equations,
Industrial Mathematics

11. K. S. Parihar Mechanics of Solids

12. Sachin B. Patkar Combinatorial Optimization
Algorithms

13.J. Prakash Tribology

14. Prem Narain Numerical Analysis

15. Inder K. Rana Harmonic Analysis

16. Akhil Ranjan Differential Geometry.

17. S. V. Sabnis Reliability Theory
Industrial Statistics

18. V.D.Sharma Quasilinear Systems of PDEs
Nonlinear Waves

19. A. R. Shastri Algebraic Geometry
Algebraic Topology

20. Sivaramakrishnan N. Complex Analysis

21. G. K. Srinivasan Partial Differential Equations.

22. M. K. Srinivasan Combinatorics

23. A. Subramanyam Statistical Inference
Geostatistics

24. P. Vellaisamy Statistical Inference

25. J. K. Verma Commutative Algebra