

Curriculum Vitae and List of publications of

Kalyan B. Sinha

1. **Name** : **Kalyan Bidhan Sinha**
2. **Date of birth** : June 3, 1944
3. **Present Position** Director and Distinguished Scientist
Indian Statistical Institute
4. **Official address** : Mathematics-Statistics Division
Indian Statistical Institute
203, B.T. Road
Kolkata - 700035, India
5. **Phone** : 091-33-577-3084 (Office)
091-33-216-6740 (Resi.)
6. **Fax** : 091-33-577-6925

7. Positions held

- August'2000 - Director, Indian Statistical Institute.
- Oct. 99 - Dec.99 Visiting Professor, Science University of Tokyo, Japan
- July'98 - Distinguished Scientist, Indian Statistical
Institute.
- Dec. 78 - July'98 Professor, Mathematics-Statistics Division,
Indian Statistical Institute, New Delhi.
- Oct. 96 - June'97 Professor, Jawaharlal Nehru University,
New Delhi (on leave from Indian Statistical Institute,
New Delhi.)
- Dec. 78 - Sep. 96 Professor, Mathematics-Statistics Division,
Indian Statistical Institute, New Delhi.
- Jan. 95 - April 95 Visiting Professor, RIMS, Kyoto

University, Japan

- Jan. 85 - May 85 Visiting Professor, Department of Mathematics,
University of Texas, Austin, U.S.A.
- Jul. 85 - Dec. 84 Visiting Professor, Department of Mathematics
and Physics, University of Manitoba, Canada
- Jan. 80 - May 80 Ulam Chair Professor, Department of Mathematics
University of Colorado, Boulder, U.S.A.
- Aug. 78 - Oct. 78 Visiting Professor, Catholic University of
Louvain-la-Neuve, Belgium.
- Aug. 77 - Jul. 78 Visiting Professor, Univ. of Sao Paolo, Brazil
- Aug. 74 - Aug. 77 Research Associate, Institute de Physique
Theorique, University of Geneva, Switzerland
- Mar. 72 - May 74 Research Associate and Instructor, Department of
Mathematics, Indian Institute of Technology, Madras
- Jan. 70 - Dec. 71 Research Associate, University of Geneva, Switzerland
- May 69 - Oct. 69 Post doctoral fellow, University of Rochester, U.S.A.
- Jan. 66 - Apr. 69 Research Assistant, University of Rochester, U.S.A.

8. Academic Qualification

- Bachelor of Science (Hons.) 1963 Calcutta University
- Master of Science 1965 Delhi University
- Doctor of Philosophy 1969 University of Rochester, N.Y U.S.A.

9. Awards and honours

- (i) Gold Medal of Calcutta University 1961.
- (ii) J.C. Bose Science Talent Search Scholarship 1960-65.
- (iii) Ulam Chair Professor in the Department of Mathematics, University of Colorado, Boulder, USA in 1980.
- (iv) S.S. Bhatnagar prize in Mathematical Sciences by CSIR, India in 1988.
- (v) C.V. Raman Gold Medal by Jagdish Bose National Science Talent Search Organization 1990.
- (vi) Second Ganesh Prasad Memorial Award Lecturer of the Indian Mathematical Society at its annual meeting in Aligarh, 1995.

(vii) Platinum Jubilee lecturer in the Mathematics Section of the 83rd Session of the Indian Science Congress at Patiala 1996.

10 (a). List of Publications

1. K.B. Sinha, G.G. Emch; A no-interaction theorem for Bose fields *Bull. Amer. Phys. Soc.*, **14**, (1969), 89.
2. J.M. Jauch., B. Misra, K.B. Sinha; Time delay in scattering processes, *Helv. Phys. Acta* **45**, (1972), 398-426, MR : 81.47.
3. J.M. Jauch, K.B. Sinha; Scattering systems with finite total cross-section, *Helv. Phys. Acta* **45**, (1972), 580.
4. K.B. Sinha; On the decay of an unstable particle *Helv. Phys. Acta* **45**, (1972), 619-628, MR : 81.47.
5. P. Rejto, K.B. Sinha; Local decay in presence of a Stark-like field *Jauch Memorial seminar at Battelle Inst., Geneva.*, (1975).
6. P. Achuthan, T. Chandramohan, K.B. Sinha; Inelasticity in γ - γ collision, *Pramana*, **9**, (1977), 41.
7. P. Rejto, K.B. Sinha; Absolute continuity for a 1-dim. model of Stark Hamiltonian *Helv. Phys. Acta*, **49**, (1976), 389-413, MR : 81.47.
8. K.B. Sinha; Decay in presence of a uniform electric field, *Lett. Math. Phys.* **1**, (1976), 251-257, MR : 81.47.
9. K.B. Sinha; On the absolutely and singularly continuous sub-spaces in scattering theory, *Ann. Inst. Henri Poincare* **16**, (1977), 263-277, MR : 81.47.
10. B. Misra, K.B. Sinha; A remark on the rate of regeneration in decay processes *Helv. Phys. Acta* **50**, (1977), 99-104, MR : 81.47.
11. T.S. Santhanam, K.B. Sinha; Quantum mechanics in finite dim. II *Australian Jour. Phys.* **31**, (1978), 233.
12. K.B. Sinha; Relative scattering and timedelay in presence of a uniform electric field, *Reports in Math. Phys* **14**, (1979), 65-73, MR : 81F15.
13. G.G. Emch, K.B. Sinha; Weak quantization in a non-perturbative model *Jour. Math. Phys.*, **20**(7), (1979), 1336-1340, MR : 81C12.
14. W.O. Amrein, D.B. Pearson, K.B. Sinha; Bounds for N-particle scattering cross-section. *Nuovo Ciment* **52A**, (1979), 115-131, MR : 81F10.
15. K.R. Parthasarathy, K.B. Sinha; Random Trotter-Kato product formula, *Statistics and Prob.; Essays in honour of C.R. Rao, North Holland*, (1981), 553-565, MR : 47D05.
16. K. Gustafson, K.B. Sinha; On Eisenbud-Wigner formula for time delay, *Lett. Math. Phys.* **4**, (1980), 381-385, MR : 81F05.
17. K.B. Sinha; Time-delay and resonance in simple scattering system, *Proceeding of the special session of AMS on Mathematical Physics, Plenum Press.* (1981).
18. W.O. Amrein, K.B. Sinha; Three body scattering cross-section, *Jour. Phys. A*, **15**, (1982), 1567-1586, MR : 81F10.
19. K.R. Parthasarathy, K.B. Sinha; Feynman path integrals of operator-valued maps, *Jour. Math. Phys.* **23**, (1982), 1459-1462, MR : 58D30.
20. K.R. Parthasarathy, K.B. Sinha; On the stochastic Dyson series, *Springer Lecture note in Control and Information Sciences*, **49**, (1983), 227-232, MR : 60H05.

21. K.B. Sinha, PL. Muthuramalingam; Asymptotic evolution of certain observables and completeness in Coulomb scattering I, *Jour. func. Analysis*, **55**, (1984), 323-343, MR : 35P25.
22. PL. Muthuramalingam, K.B. Sinha; Asymptotic completeness in longrange scattering II, *Ann. Sci. de ecole norm. superiure, Paris*, **t18**, (1985), 57-87, MR : 35P25.
23. K.B. Sinha, M. Krishna, PL. Muthuramalingam; Completeness in three-body scattering, *Ann. Inst. Henri Poincare* **A41**, (1984), 79-101, MR : 81F10.
24. T. Osborn, K.B. Sinha, D. Bolle, C. Daneels; Spectral Sumrules for timedelay in R^2 . *Jour. Math. Phys.*, **26(11)**, (1985), 2796-2802, MR : 81F05.
25. K.R. Parthasarathy, K.B. Sinha; Stochastic integral representation of bounded quantum martingales in Fock space, *Jour. Func. Anal.*, **67**, (1986), 126-151, MR : 46L50.
26. K.R. Parthasarathy, K.B. Sinha; Boson-fermion relations in several dimensions *Pramana* **27**, (1986), 105.
27. K.B. Sinha; Quantum stochastic integrals and martingales, *Orissa Math. Soc. Journal* **5(1)**, (1986), 57-65, MR : 81C20.
28. K.B. Sinha; Mathematical theory of scattering in quantum mechanics - a review, *Current Science* **56**, (1987), 293.
29. K.R. Parthasarathy, K.B. Sinha; Stoptimes in Fock space stochastic calculus, *Probability Theory and Related fields, Springer*, **75**, (1987), 317-349, MR : 81D05.
30. K.B. Sinha; Wigner-Weisskopf atom and quantum stochastic dilations, *Proceedings of the Indian Academy of Sci. (Chemical Sciences)* **99(1-2)**, (1987), 3.
31. K.B. Sinha, K.R. Parthasarathy; Stop times in Fock space stochastic calculus, *Proceedings of the 1st World Congress of the Bernoulli society* vol 1, (1986), 495-498, MR : 81S25.
32. K.R. Parthasarathy, K.B. Sinha; Representation of a class of quantum martingales II *Lecture Notes in Math. Springer Verlag*, **1303**, (1988), 232-250, MR : 46L50.
33. PL. Muthuramalingam, K.B. Sinha; Existence and completeness of wave operators for the Dirac operator with longrange E.M. potentials, *Journal Ind. Math. Soc.* **50**, (1988), 103-130, MR : 81U05.
34. W.O. Amrein, M. Cibils, K.B. Sinha; Configuration space properties of S-matrix in scattering theory *Ann. Inst. Henri Poincare* **47**, (1987), 367-383, MR : 35P25.
35. R. Bhatia and K.B. Sinha; A unitary analogue of Kato's theorem on variation of discrete spectra, *Lett. Math. Phys.* **15**, (1988), 201-204, MR : 47A55.
36. L. Accardi and K.B. Sinha; Stop-time Algebras *Quantum Probability and Applications IV, Springer-Verlag LNM* **1396**, (1989), 68-72, MR : 46L50.
37. P.S. Puri, J. Robertson and K.B. Sinha; A matrix limit theorem with applications to Prob. Theory, *Sankhya* **52(1)**, (1990), 58-83, MR : 81U05.
38. K.R. Parthasarathy, K.B. Sinha; Markov chains as Evans-Hudson diffusion in Fock space, ``*Seminaire Probabilities de Univ. de Strassbourg*'', XXIV (1988/89), LNM 1426, Springer-Verlag (1990), MR : 46L50.
39. A. Mohari and K.B. Sinha; Diffusion with infinite degrees of freedom and countable state markov processes, *Sankhya*, **52(1)**, (1990), 43-57, MR : 81S25.

40. K.B. Sinha: Quantum Mechanics and Spectral theory, proceedings of a national seminar on Mathematics held at the department of Pure Mathematics, University of Calcutta in June, (1990), 8-15, MR : 81-02.
41. K.B. Sinha and K.R. Parthasarathy; Unification of quantum noise processes in Fock space, *Quantum Probability and Related Topics*, **6**, World Scientific, (1991), 371-384, MR : 81S25.
42. K.B. Sinha, F. Fagnola: Quantum flows with unbounded structure maps and finite degrees of freedom, *Jour. Lond. Math. Soc.* (2) **48**, (1993), 537-551, MR : 81S25.
43. K.B. Sinha, P.K. Das: Quantum flows with infinite degrees of freedom and their perturbations, *Quantum Probability and Related Topics*, **7**, World Scientific (1992), 109-123, MR : 81S25.
44. K.B. Sinha, A. Mohapatra, W.O. Amerin; Configuration properties of S-matrix and time-delay for potentials decaying like $|x|^{-\alpha} > 1$, *Ann. Inst. Henri Poincare*, **57**, (1992), 89-113, MR : 81U05.
45. K.B. Sinha, A. Mohapatra; Time-delay in short range potential scattering, the proceedings of Workshop on Schrödinger operators, Ed. E. Balslev, Springer-Verlag, (1992), 175-185, MR : 81U05.
46. K.B. Sinha; Some mathematical aspects of Feynman Integrals and their applications, *Dirac and Feynman-Pioneers in Quantum Mechanics*, Ed. R. Dutt, A. Ray, Wiley Eastern, New Delhi (1993).
47. K.B. Sinha, B.R. Bhat; A Stochastic Differential Equation with Time-dependent and unbounded Operator Coefficients, *Jour. Funct. Anal.* **114**, (1993), 12-31, MR : 60H10.
48. K.B. Sinha, F. Fagnola : Scattering theory for unitary cocycles, *Kallianpur Festschrift*, Ed. S. Cambanis et al, Springer Verlag, (1993), MR : 81S25.
49. K.B. Sinha, A. Mohari : Stochastic dilation of minimal quantum dynamical semigroup, *Proceedings of the Indian Academy of Sciences (Math. Sciences)*, **102**, (1992), 159-173, MR : 81S25.
50. K.B. Sinha, W.O. Amrein, Pairs of Projections in a Hilbert space, *Linear Algebra and its Applications*, **208/209**, (1994), 425-435, MR : 47A53.
51. K.B. Sinha, Quantum Dynamical Semigroups, *Operator Theory, Advances and Applications*, **70**, (1994), 161-169, Birkhauser, MR : 81S25.
52. K.B. Sinha, B.R. Bhat, Examples of unbounded generators leading to nonconservative minimal semigroups, *Quantum Probability and Related Topics*, **9**, World Scientific, (1994).
53. K.B. Sinha and R. Bhatia, Variation of Real Powers of Positive Operators, *Indiana University Mathematics Journal*, **43**, (1994), 913-925, MR : 47B15.
54. K.B. Sinha, On the collapse postulate of Quantum Mechanics, *Mathematical Physics towards the 21st Century*, Ed. R.N. Sen, A. Gersten, 344-350, Ben Gurion University, Beer-sheva, Israel (1994).
55. K.B. Sinha, A.N. Mohapatra, Spectral shift function and trace formula, *Spectral and inverse spectral theory*, Diamond Jubilee volume of the Proceedings of the Indian Academy of Sciences (Mathematical Science), **104** (4), (1994), 819-853, MR : 47A55.

56. K.B. Sinha, Index of a pair of projections and applications, to appear in *Some current trends in Mathematics and Physics (A tribute to Harish Chandra)*, 198-207, Narosa, New Delhi, (1995), MR : 47A99.
57. K.B. Sinha, Quantum Stochastic Calculus - a Review, *RIMS Kokyuroku* **923**, (1995), 206-227, MR : 81S25.
58. K.B. Sinha, H. Araki, V.S. Sunder, On the boundedness and $\|\cdot\|_p$ - continuity of second quantization, *Publications of RIMS, Kyoto University*, **31(5)**, (1995), 941-952, MR : 81S05.
59. K.B. Sinha, A. Mohapatra, Spectral Shift Function and Trace Formula for Unitaries - a new proof, *Integral Equations and Operator Theory* **24**, (1996), 285-297, MR : 47A55.
60. K.B. Sinha, F. Fagnola, B.V.R. Bhat, Confining one-dimensional Brownian motion, *Russian Journal of Math. Physics*, John Wiley, N.Y. **4(1)**, (1996), 13-28, MR : 81S25.
61. K.B. Sinha, On Nelson's Stochastic mechanics, to appear in the proceedings of a workshop on 'Complex Structures' Springer-Verlag, (1997).
62. K.B. Sinha, J.M. Lindsay; Feynman-Kac representation of some non-commutative elliptic operators, *Jour. Funct. Anal.*, **47 (2)**, (1997), 400-419, MR : 46L55
63. K.B. Sinha, S. Attal, Stop time integrals, *Quantum Probability and Communications*, vol X, (1998).
64. K.B. Sinha, Representations of q-CR, in *Analysis, Geometry and Probability*, Ed. R. Bhatia, trim series, Hindustan, Delhi (1996), MR : 81S05.
65. K.B. Sinha, Quantum Stochastic Calculus and Applications - "Probability towards 2000", lecture notes in Statistics # 128, Springer-verlag (1998), MR : 81S25.
66. K.B. Sinha, R. Bhatia, Dinesh Singh - Higher Derivations of Some Operator Functions, *Comm. Math. Phys.* **191**, (1998), 603-611, MR : 47A60.
67. K.B. Sinha, K.R. Parthasarathy - Quantum Markov Processes with a Christensen - Evans generator in a von Neuman algebra, *Bull. Lond. Math. Soc.*, **31** (1999) 616-626, MR : 81S25.
68. K.B. Sinha - Quantum Mechanics of Dissipative Systems, *Jour. Ind. Inst. Science*, **77**, (1997), 275-279, MR : 82C10.
69. K.B. Sinha, D. Goswami - Minimal Q.D Semigroup on a von Neumann algebra, *Infinite Dimensional analysis, Quantum Probability and related fields*, (World Scientific), **2**, (1999), 221-239, MR : 46L55.
70. K.B. Sinha, D. Goswami - Hilbert Modules and Stochastic Dilation of a Quantum Dynamical Semigroup on a von Neumann Algebra, *Comm. Math. Phys.*, **205**, (1999), 377-403, MR : 81S25.
71. K.B. Sinha, D. Goswami, J.M. Lindsay, S. Wills, Dilation of CP flow on a von Neumann algebra, to appear in *Pac. Jour. Math.*
72. K.B. Sinha, M. Demuth, Schrodinger operators with empty singular continuous spectrum, *Math. Physics, Analysis & Geometry*, **2**, (1999), 223-244, MR : 47F05.

73. K.B. Sinha, Quantum Stop Times, lectures delivered at a workshop on Quantum Probability in Institut Fourier, Grenoble, France in June' 98. to appear in Quantum Probability and Communications, World Scientific.
74. K.B. Sinha, R. Bhatia, Derivations, Derivatives and chain rules, Lin. Alg. and Applications, **302-303**, (1999), 231-244, MR : 47A60.
75. K.B. Sinha, C. Fernandez, On a theory of resonance in Quantum Mechanical Scattering, ``Stochastic analysis and Mathematical Physics'', ed. R. Rebolledo, 2000, MR : 81U05.
76. K.B. Sinha, Derivations and Applications, invited address to the Chilean Mathematical Society in October'98 to appear in the proceedings.
77. K.B. Sinha, D. Goswami, A. Pal, Existence of Evans-Hudson Dilation in a C^* -algebraic set-up, Inf. Dim. Anal and Quantum Prob., World Scientific **3**(1), (2000), 177-184, MR : 81S25.
78. K.B. Sinha, D. Goswami, P.S. Chakraborty, A covariant Quantum Stochastic Dilation theory, ``Stochastics in Finite and Infinite Dimensions (in honour of G. Kallianpur,)" Birkhauser (2000), 89-100, MR : 46L60.
79. K.B. Sinha and M. Krishna, Spectra of Anderson type models with decaying randomness, to appear in Proc. Ind. Acad. Sc. (Math. Sciences), **111**(2), (2001), 179-201, MR : 82B44.
80. K.B. Sinha, D. Goswami, P.S. Chakraborty, Probability and Geometry on some non-commutative manifolds, to appear in Jour. Oper. Theory.
81. K.B. Sinha, E. Giere, M. Demuth, A semigroup criterion for the completeness of scattering systems, Operator Theory : Advances and Applications, **126**, (2001), 93-102.
82. K.B. Sinha, Geometry in Non-Commutative Language and Quantum Mechanics, to appear in a volume on Pure Mathematics on the occasion of the Golden Jubilee of the Indian Institute of Technology, Kharagpur.
83. K.B. Sinha, D. Goswami, Quantum Stochastic Flows on a von Neumann algebra, submitted for publication.
84. K.B. Sinha, P.S. Chakraborty, Geometry on Quantum Heisenberg Mainfold, in preparation.

10(b): List of technical reports/review:

1. K.B. Sinha; Irreducible CCR systems and field theory, *University of Rochester Report*, 1969.
2. On a theorem on M.G. Krein, *University of Geneva Report*, 1975.

11. Books Published

- (i) W.O. Amrein, J.M. Jauch, K.B. Sinha; *Scattering theory in quantum mechanics-physical principles and mathematical methods*, W.A. Benjamin, Inc. Reading, Mass. - London - Amsterdam, 1977.

This book has been reviewed extensively as an outstanding text and reference book on the subject, for example in *Mathematica Reviews* (# 14631, Vol. 58, 1979), *Zentralblatt für Mathematik* (Vol. 376, Dec. 1978), *Physics today* (June 1978), *Current Science* (Vol. 47, Oct. 1978), *Bulletin of the Institute of Mathematics and its applications* (Vol. 15, Nov. 1979).

(ii) Guest editor, *Special Diamond Jubilee Issue of the Proceedings of Indian Academy of Sciences, Bangalore (Mathematical Sciences)*, 1994.

(iii) *Understanding Mathematics, University Press, Hyderabad - under the INSA Science Education Programme (with 4 other authors)*, 2000.

Chairmanship of symposia and invited lectures:

Dr. K.B. Sinha chaired a session each in :

(a) American Mathematical Society regional meeting on Mathematical Physics held at University of Colorado, Boulder in March 1980.

(b) U.G.C. national seminar on stochastic processes and their applications held at Sambalpur University, Orissa in December 1985.

He delivered invited lectures at :

(i) Universities of Paris at St. Denis and at Orsay in 1976, Catholic University of Rio-de-Janeiro, Brazil in 1977, Academy of Sciences of German Democratic Republic, Berlin in 1977, University of Denver, Colorado in 1980, University of Rochester, New York in 1984, Visva-Bharathi, West Bengal and Jadavpur University in 1986 on scattering theory in Quantum Mechanics,

(ii) University of Bielefeld, Federal Republic of Germany, Free University of Brussels, and Catholic University of Louvain-la Neuve, Belgium in 1976 on the decay of unstable systems;

(iii) American Mathematical Society regional meeting at Boulder, Colorado in 1980 on timedelay in scattering theory;

(iv) University of Rochester, New York in 1980 on the Feynman integral;

(v) Ecole Polytechnique Federale, Lausanne, Switzerland in 1983 and in 1985 on 3-particle scattering and quantum stochastic processes respectively,

(vi) Western Union meeting of Mathematical Physics at California Institute of Technology, Pasadena in 1985 on N-particle scattering,

(vii) U.G.C. seminar on stochastic processes at Sambalpur University, Orissa in 1985 on quantum stochastic calculus,

(viii) University of Rome II, Italy in 1987 on quantum stochastic processes and applications,

(ix) Meeting on quantum probability and stochastic processes at the Mathematics Institute, Oberwolfach, F.R.G. in January 1987 on stoptime in Fock space,

(x) First national meeting on theoretical chemistry at Punjab University, Chandigarh in 1986 on Wigner-Weisskopf atom,

(xi) Visitor's program at Delhi University in 1983 and in 1987 on Brownian

motion and on timedelay in scattering respectively.

(xii) Workshop on Quantum Probability and Applications, held in Univ. of the Heidelberg, FRG 1988 and in Tronto, Italy in 1989.

(xiii) Workshop on Schrödinger Operators, held in Aarhus University, Denmark, May - July' 91.

(xiv) Invited speaker in the meeting on Quantum Stochastics at the Mathematics Institute, Oberwolfach, Germany in December'91.

(xv) In the Conference on Mathematical Methods in Quantum Mechanics, held in Berlin, May 1993.

(xvi) In the conference on Quantum Stochastic Processes at CIRM, Marseilles, France in June 1994.

(xvii) In the departments of Mathematics at Universities of Nara, Kanazawa, Tokyo and Nagoya, Japan and in a symposium on "Quantum Theory on Gaussian Spaces and Quantum Probability", held in March 1995 in RIMS, Kyoto University.

(xviii) In the Symposium on "Probability towards 2000", held in Columbia University, N.Y. during October 1-6, 1995.

(xix) In the Conference on "Partial Differential Equations", in Potsdam, Germany in July 1996.

(xx) In the annual meeting of the Jawaharalal Nehru centre for Advanced Research, Bangalore in November 1996.

(xxi) Conference on Quantum Probability & Infinite Dimensional Analysis, Univ. of Rome II at Frascati, Rome, February 1997.

(xxii) Invited speaker, Midyear meeting of the Indian Academy of Sciences, July'97 Bangalore.

(xxiii) Invited speaker at Symposium on "50 years of Mathematics in India" at Matscience, November'97 Chennai.

(xxiv) Symposium on "Stochastic Analysis & Spectral theory" in Oberwolfach, Germany, July 1998.

(xxv) Invited speaker in the Department of Mathematics, Universities of Tennessee at Knoxville, of Louisiana at Baton Rouge, of California at Berkeley in Summer 1999.

(xxvi) Invited speaker, Satellite meeting on „Non-Commutative Geometry and Stochastic Processes" in Nottingham in June, 2000.

(xxvii) Spoke on „Covariance in Quantum Stochastic Processes" in IAMP Congress, London, 2000.

12. Additional information

(i) Dr. K.B. Sinha is a member of the following professional bodies/committees:

- (a) Life Member of the International Association of Mathematical Physics,
- (b) Fellow of the Indian Academy of Sciences, Bangalore,
- (c) Fellow, Indian National Science Academy, New Delhi.
- (d) Life Member of the Indian Mathematical Society.

- (e) Past Vice President, Indian Academy of Sciences, Bangalore.
 - (f) Past Chairman, Project Advisory Committee (Mathematical Sciences), Department of Science and Technology, Ministry of Science and Technology, Government of India.
 - (g) Honorary Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.
 - (h) Member, Governing Council of Mehta Research Institute, Allahabad.
 - (j) Member, Editorial Boards, Infinite Dimensional Analysis, Quantum Probability and Related Topics, World Scientific; and Reviews in Mathematical Physics, World Scientific.
- (ii) He is also a regular reviewer for the Mathematical Reviews and Zentralblatt für Mathematik, and had been a member of the Editorial Board of the Proceedings, Mathematical Sciences, of the Indian Academy Sciences.
- (iii) A review by G.W. Johnson of a book "Open Quantum Systems and Feynman Integrals" by P. Exner, Dordrecht, 1985, has appeared in which his work has played a significant role.
- (iv) References to his work has been cited in Encyclopedic Dictionary of Mathematics, M.I.T. Press, Cambridge (Mass), 1987 (ed. by Japanese Math. Soc.).