

# CURRICULUM VITÆ

## 1. PERSONAL

Name: **SRINIVASAN, KESAVAN**  
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E-Mail: kesh@imsc.res.in  
Nationality: Indian  
Date of Birth: 17 January 1952  
Marital Status: Married  
No. of Children: Two  
Languages Known: (Reading, writing and speaking)  
Indian:Tamil  
Foreign:English and French.  
Present Position: Adjunct Professor, IIT, Madras.  
Other Positions: Visiting Professor, IIT, Madras (1/2/2016-31/1/2017)  
Professor (I), (up to January 31, 2016)  
The Institute of Mathematical Sciences,Chennai.  
Deputy Director, Chennai Mathematical Institute  
(July, 2007- June, 2010).

## 2. ACADEMIC QUALIFICATIONS

1. B.Sc.(Mathematics), University of Madras, I Class, 1971.
2. M.Sc.(Mathematics), Indian Institute of Technology, Madras, I Class, I Rank, 1973
3. Docteur-es-Sciences Mathématiques, Université Pierre et Marie Curie (Paris VI), awarded for the thesis entitled *Sur l'approximation de problèmes linéaires et nonlinéaires de valeurs propres*, supervised by Professors J.L.Lions and P.G.Ciarlet,1979.

### 3. DISTINCTIONS

- Was awarded the National Science Talent Search Scholarship of the NCERT during the period 1968-1976.
- Elected **Fellow** of the **National Academy of Sciences**, Allahabad, India, in 1997.
- Won the **Tamil Nadu Scientist Award (TANSA)**, given by the Tamil Nadu State Council for Science and Technology, in Mathematical Sciences for 1998.
- Won the **C. L. Chandna Award for Outstanding Contributions to Mathematics Research and Teaching**, 1999.
- Member, National Board for Higher Mathematics.
- Nominated by INSA to be a member of the Official Indian Delegation to the General Assembly of the International Mathematical Union and presented the Indian bid for ICM,2010.
- Elected **Fellow** of the **Indian Academy of Sciences**, Bangalore, in 2008.
- Elected as Secretary (Grants) of the **Commission for Developing Countries (CDC)** of the **International Mathematical Union** for the period 2011-2014. Re-elected for a second term 2015-2018.
- Honoured by the Indian Society for Industrial and Applied Mathematics (ISIAM) for ‘sustained contributions to applied mathematics’, August 2010, on the occasion of 25 years of ISIAM.
- **Visitor’s Nominee**, Selection Board for Academic Staff, School of Sciences, Indira Gandhi National Open University (IGNOU), New Delhi (from 2005-08).
- **Visitor’s Nominee**, Selection Board for Academic Staff, Department of Mathematics, Indian Institute of Technology (IIT), Guwahati, 2015-2018.
- Elected **Vice President** of the Ramanujan Mathematical Society for the period April 1, 2016 - March 31, 2019.

## 4. PUBLICATIONS

### a. Books

1. **Topics in Functional Analysis and Applications**, Wiley-Eastern Ltd., 1989, ISBN 81-224-0062-0 (John Wiley and Sons Inc., 1989, ISBN 0-470-21050-8).
2. **Nonlinear Functional Analysis - A First Course**, Texts and Readings in Mathematics (TRIM), **28**, Hindustan Book Agency, 2004, ISBN 81-85931-46-1.
3. **Symmetrization and Applications**, Series in Analysis, Volume 3, World Scientific, 2006, ISBN 981-256-733-X.
4. **Functional Analysis**, Texts and Readings in Mathematics (TRIM), **52**, Hindustan Book Agency, 2009, ISBN 978-81-85931-87-6.
5. **Measure and Integration**, Texts and readings in Mathematics (TRIM), **77**, Hindustan Book Agency, 2019, ISBN 978-93-86279-77-4.

### b. Research Papers

1. An interesting property of square matrices, *Math. Magazine*, Vol.44, 2, pp. 99-101, 1971.
2. A lower bound for the number of topologies on a finite set, *Proc. Ind. Nat. Sc. Acad.*, Vol. 41, Part A, 3, pp. 207-212, 1975.
3. Homogénéisation et valeurs propres, *Comptes Rend.Acad.Sc.*, Paris, t. 285, Série A, pp. 229 -232, 1977.
4. (With M.Vanninathan) L'homogénéisation d'un problème de contrôle optimal, *Comptes Rend. Acad. Sc.*, Paris, t. 285, Série A, pp. 441-444, 1977.
5. (With M.Vanninathan) Sur une méthode d'éléments finis mixte pour l'équation biharmonique, *RAIRO, Anal. Num.*, Vol. 11, 3, pp. 255-270, 1977.
6. Homogenization of elliptic eigenvalue problems, Part I, *Appl. Math. Optim*, Vol. 5, pp. 153-167, 1979.
7. Homogenization of elliptic eigenvalue problems, Part II, *Appl. Math. Optim*, Vol. 5, pp. 197-216, 1979.
8. La méthode de Kikuchi appliquée aux équations de von Karman, *Numer. Math.*, Vol. 32, pp. 209-232, 1979.
9. (With P.G.Ciarlet) Approximation bi-dimensionnelle d'un problème de valeurs propres, *Comptes Rend. Acad. Sc.*, Paris, t. 289, Série A, pp. 579-582, 1979.
10. Une méthode d'éléments finis mixte pour les équations de von Karman, *RAIRO, Anal. Num.*, Vol. 14, 2, pp. 149-173, 1980.
11. Application of Newton's method to a homogenization problem, *Proc. Ind. Acad. Sc., Math. Sc.*, Vol. 90, pp. 229-238, 1981.
12. (With P.G.Ciarlet) Two dimensional approximations of three dimensional eigenvalue problems in plate theory, *Comp. Meth. Appl. Mech. Engg.*, Vol. 26, pp. 145-172, 1982.
13. (With P.N.Srikanth) On the Dirichlet problem for the Marguerre equations, *J. Nonlin. Anal. TMA*, Vol.7, 2, pp. 209-216, 1983.

14. Existence of solutions by the Galerkin method for a class of nonlinear problems, *Applicable Anal.*, Vol.16, 4, pp. 279-290, 1983.
15. A potential method for the biharmonic equation, *Numer. Math.*, Vol. 43, pp. 105-119, 1984.
16. (With A.S.Vasudevamurthy) On some boundary element methods for the heat equation, *Numer. Math.*, Vol. 46, pp. 101-120, 1985.
17. Some remarks on a result of Talenti, *Ann. Scuola Norm. Sup. Pisa*, Serie IV, Vol. XV, 3, pp. 453-465, 1988.
18. On a comparison theorem via symmetrization, *Proc. Roy. Soc. Edin.*, 119 A, pp. 159-167, 1991.
19. (With Adimurthi and S.L.Yadava) On the best constant in an inequality by J.Moser, *Theory of Differential Equations and Applications to Oceanography*, eds. S.G.Deo and Y.S.Prahlad, Affiliated East-West Press Pvt. Ltd., pp.66-71, 1992.
20. (With F.Pacella) Symmetry of positive solutions of a quasilinear elliptic equation via isoperimetric inequalities, *Applicable Anal.*, Vol.54, pp. 27-37, 1994.
21. Comparison theorems via symmetrization:revisited, *Boll. Unione Mat. Ital.*, Vol. 7, 11-A, pp. 163-172, 1997.
22. (With J.Saint Jean Paulin) Homogenization of an optimal control problem, *SIAM J. of Control and Optim.*, Vol. 35, No. 5, pp. 1557 - 1573, 1997.
23. (With M.Grossi, F.Pacella and M.Ramaswamy) Symmetry of positive solutions of some nonlinear equations, *Topological Methods in Nonlinear Analysis*, Vol. 12, pp. 47 - 59,1998.
24. (With F.Pacella) Symmetry of solutions of a system of semilinear elliptic equations, *Advances in Mathematical Sciences and Applications*, Vol. 9, No. 1, pp. 361 - 369, 1999.
25. (With J. Saint Jean Paulin) Optimal control on perforated domains, *J. Math. Anal. Appl.*, Vol. 229, pp. 563 - 586, 1999.
26. (With N. Sabu) Two dimensional approximation of eigenvalue Problems in shallow shell theory, *Mathematics and Mechanics of Solids*, Vol. 4, pp. 441 - 460, 1999.
27. (With N. Sabu) One- dimensional approximation of eigenvalue problems in thin rods, in *Function Spaces and Applications*, D. E. Edmunds *et al* (eds.), Narosa, pp. 131 - 142, 1999.
28. (With M. Rajesh) Homogenization of periodic optimal control problems via multi-scale convergence, *Proceedings of the Indian Academy of Sciences, Mathematical Sciences*, Vol. 108, No. 2, pp. 189 - 207, 1998.
29. (With N. Sabu) Two - dimensional approximation of eigenvalue problems in shell theory: flexural shells, *Chinese Annals of Mathematics*, Vol. 21B, No. 1, pp. 1 - 16, 2000.
30. Isoperimetric inequalities in partial differential equations, *Proc. Nat. Acad. Sc.*, India, Vol. LXIX, Section A, Part IV, pp. 393 - 418, 1999.
31. (With J. Saint Jean Paulin) Low cost control problems, *Trends in Industrial and Applied Mathematics*, A. H. Siddiqi and M. Kočvara (eds.), pp. 251 - 274, 2002.
32. (With J. Saint Jean Paulin) Quelques problèmes de contrôle bon marché,

- Comptes Rend. Acad. Sc., Paris*, t. **332**, Série 1, pp. 67 - 72, 2001.
33. (with M. Rajesh) On the limit matrix obtained in the homogenization of an optimal control problem, *Proc. Indian Acad. Sci. (Math. Sci.)*, **112**, No. 2, pp. 337 - 346, 2002.
34. (with R. Bunoiu) Fluide de Bingham dans une couche mince, *Annales de l'Université de Craiova*, Série Mathématique-Informatique, Actes du 6ème Colloque Franco-Roumain de Mathématiques Appliquées, **30**, pp. 1 - 7, 2003.
35. (with R. Bunoiu) Asymptotic behaviour of a Bingham fluid in thin layers, *J. Math. Analysis. Appl.*, **293**, 2004, pp. 405 - 418.
36. On two functionals connected to the Laplacian in a class of doubly connected domains, *Proc. Royal Soc. Edin.*, **133**, No. 3, pp. 617 - 624, 2003.
37. On Poncaré and J. L. Lions' lemmas, *Comptes. Rend. Acad. Sc., Paris*, Ser. I, **340**, pp.27 - 30, 2005.
38. (with P. G. Ciarlet and L. Gratie) Numerical Analysis of the generalized von Kármán equations, *Comptes Rend. Acad. Sc., Paris*, Ser. I, **341**, pp. 695 - 699, 2005.
39. (with P. G. Ciarlet and L. Gratie) On the generalized von Kármán equations and their approximation, *Math. Models and Meth. in Applied Sciences*, **17**, No. 4, pp.617 - 633, 2007.
40. (with C. Amrouche, P. G. Ciarlet and L. Gratie) New formulations of linearized elasticity problems, based on extensions of Donati's theorem, *Comptes Rend. Acad. Sc., Paris*, Sé. I, **342**, pp. 785 - 789, 2006.
41. (with C. Amrouche, P. G. Ciarlet and L. Gratie) On Saint Venant's compatibility conditions and Poincaré's lemma, *Comptes Rend. Acad. Sc., Paris*, Sér. I, **342**, pp. 887 - 891, 2006.
42. (with C. Amrouche, P. G. Ciarlet and L. Gratie) On the characterization of matrix fields as linearized strain tensor fields, *J. Math. Pures et Appliquées*, **86**, pp. 116 - 132, 2006.
43. (with T. Muthukumar) Low cost control problems on perforated and non-perforated domains, *Proc. Indian Acad. Sci., (Math. Sci.)*, **118**, No. 1, pp. 133 - 157, 2008.
44. (with J.-P. Raymond) On a degenerate Riccati equation, *Control and Cybernetics*, **38**, No. 4B, pp. 1393-1410, 2009.
45. (with T. Muthukumar) Homogenization of an optimal control problem with state-constraints, *Differential Equations and Dynamical Systems, Differential Equations and Dynamical Systems*, **19**, No. 4, pp. 361-374, 2011.

#### c.Conference Proceedings

1. Homogenization of elliptic eigenvalue problems, Invited Address, *Numerical Analysis of Singular Perturbation Problems*, eds. P.W.Hemker and J.J.H.Miller, pp. 275-294, Academic Press, 1979.
2. Finite element methods for the von Karman equations, *Nonlinear Problems of Analysis, Geometry and Mechanics*, eds. Atteia *et al*, pp. 137-142, Pitman Research Notes in Mathematics, No. 46, 1981.
3. Symmetrization and isoperimetric inequalities, *Proceedings of the Symposium on Operator Theory and Functional Analysis*, Publication No.18,

- Centre for Mathematical Sciences, Trivandrum, India, 1991.
4. Comparison theorems via Schwarz symmetrization-A survey, *Proceedings of the International Conference on Partial Differential Equations of Elliptic Type*, Cortona, Italy, 1992, Symposia Mathematica, Vol.XXXV, Cambridge University Press, 1994.
  5. Homogenization and Optimal Control, *Functional Analysis with Current Applications in Science, Techology and Industry*, eds. M. Brokate and A. H. Siddiqi, Pitman Research Notes in Mathematics Series, No. 377, pp.103 - 117, Longman,1998.
  6. (With J. Saint Jean Paulin) Optimal Control Problems in Homogenization, in *Equations aux Dérivées Partielles et Applications, Articles dédiés à Jacques-Louis Lions*, pp. 597 - 609, Elsevier - Gauthier Villars, Paris, 1998.
  7. Symmetry of Solutions of Differential Equations, *Proceedings of the National Seminar on Applications of Mathematics*, St. Joseph's College, Tiruchirappalli, India, February, 2000, pp. 29 - 35.
  8. Homogenization of some Low Cost Control Problems, *Proceedings of the Conference on Analysis, Wavelets and Applications*, February, 2000, in *Analysis and Applications*, H. P. Dikshit and P. K. Jain (eds.), Narosa, 2002, pp. 121 - 130.
  9. On the asymptotic behaviour of a Bingham fluid in thin layers, *Proceedings of the International Conference on Analysis and Applications*, December, 2003, in *Analysis and Applications*, R. S. Pathak and Nandlal (eds.), Allied Publishers Private Limited, 2004, pp. 57 - 70.
  10. On the degenerate operator Riccati equation, *Proceedings of the International Conference on Number Theory, PDE and Geometry*, University of Calicut, 2009, pp. 83-89.

#### d. Popular Articles

1. Listening to the shape of a drum, I. The Mathematics of Vibrating Drums, *Resonance*, September,1998.
2. Listening to the shape of a drum: II. You Cannot Hear the Shape of a Drum, *Resonance*, October, 1998.
3. The isoperimetric inequality, *Resonance*, September 2002.
4. Introduction to measure and integration,*Mathematics Newsletter*, Ramanujan Mathematical Society, **15**, No.2, September, 2005.
5. Integration and polar coordinates, *Resonance*, **18**, No. 11, November, 2013.
6. Continuous functions that arenowhere differentiable, *Mathematics Newsletter*, Ramanujan Mathematical Society, **24**, No. 3, December, 2013.
6. From the triangle inequality to the isoperimetric inequality, *Resonance*, **19**, No. 2, February, 2014.
7. On the general equation of the second degree, *Resonance*, **20**, No. 7, July 2015, pp. 643-662.
8. Korovkin's theorem - revisited, *Mathematics Newsletter*, Ramanujan Mathematical Society, **26**, No. 2, September, 2015.
9. (with M. T. Nair) A note on some approximation theorems in measure

theory, *Mathematics Newsletter*, Ramanujan Mathematical Society, **27**, No. 2, September, 2016.

10. A note on the grand theorems of functional analysis, *Mathematics Newsletter*, Ramanujan Mathematical Society, **27**, December 2016 - March 2017.

11. On the Hahn-Banach theorem, *Resonance*, **22**, No. 10, October 2017, pp. 915-933.

## 5. TEACHING AND OTHER ACTIVITIES

### a. Courses Taught at the TIFR Centre, Bangalore and IMSc, Chennai, CMI and IIT, Madras

1. Measure and Integration\*
2. Functional Analysis\*\*
3. Numerical Analysis
4. Functional Analysis and PDE (Distributions, Sobolev Spaces, Semigroups and Applications to PDE)
5. Finite Element Methods
6. Topics in Nonlinear Analysis (Degree Theory, Bifurcation Theory, Variational Methods etc.)

Note:

\* Taught MA5340, Measure and Integration, at IIT, Madras, during Jan-Apr. 2016.

\*\* Teaching MA5450, Functional Analysis, at IIT, Madras, during Aug-Nov., 2016.

### b. Courses Taught at Universities Abroad

1. Algebra and Calculus, Université de Paris VI, 1989-90
2. Numerical Analysis, Université de Paris VI, 1989-90 and 1995, Metz, 2001-02 and 2002-03.
3. Introduction to Symmetrization, Università degli studi di Roma, La Sapienza, 1992 and 1998.
4. Degree Theory and Applications, Università degli studi di Roma, La Sapienza, 1994.
5. Introduction to Homogenization, University of Metz, France, 2001 - 02.
6. Nonlinear Functional Analysis, University of Metz, 2002 - 03.

### c. Undergraduate Teaching

1. Calculus II, National Undergraduate Programme, Chennai Mathematical Institute.
2. Analysis I, National Undergraduate Programme, Chennai Mathematical Institute.

#### d. Guiding Research

Under the TIFR-IISc Programme, I was one of the joint supervisors for the thesis work of Mr.A.S.Vasudevamurthy of the TIFR Centre, Bangalore. I have guided the work of three more students: Mr.M.Rajesh (Indian Statistical Institute, 2001), Mr.N.Sabu (University of Madras, 2000) and Mr. T. Muthukumar (University of Madras, 2007).

Guided the work of Mr. T. V. Anoop (HBNI, 2011) together with Prof. Mythily Ramaswamy (TIFR-CAM, Bangalore).

#### e. Thesis Examinerships

I have been the examiner for Ph.D. Theses submitted to several Indian universities and to universities in France.

#### f. Other

Member, Board of Postgraduate Studies in Mathematics, Pondicherry University.

Member, Board of Postgraduate Studies in Mathematics, Cochin University of Science and Technology, 1992- 1997.

Reviewer for *Mathematical Reviews*.

Was a member of the Advisory Board of the *Indian Journal of Pure and Applied Mathematics*, published by the Indian National Science Academy.

Convenor of the Faculty appointed by the NBHM for its Nurture Programme, 1995-96 and 2000 - 2001.

**Member, National Board for Higher Mathematics.**

Member, Editorial Board, Mathematics Newsletter of the Ramanujan Mathematical Society (upto 2004, 2013-).

Member, Editorial Board, Journal of Analysis and Applications (upto 2006).

Member, Editorial Board, Bulletin of the Kerala Mathematics Association.

Member, Board of Studies in Mathematics (UG), University of Madras, (2003-06) .

Member, Board of Studies in Mathematics (PG), University of Madras, (2006-09) .

Member, Board of Studies in Mathematics (PG), Kanchi Mamuniuvar PG Centre, Pondicherry.

**Visitor's Nominee**, Selection Board for Academic Staff, School of Sciences, Indira Gandhi National Open University (IGNOU), New Delhi (from 2005-08).

**Dean of Studies and Convener, Academic Council**, Chennai Mathematical Institute (Deemed University), 2007-2010.

Member, Board of Studies (Mathematics), Chennai Mathematical Institute.

Member, Academic Council, Chennai Mathematical Institute.

Dean-Academic (Mathematics), IMSc-HBNI, 2006-2010.

Member, **Executive Organizing Committee, ICM,2010.**

Secretary (Grants), Commission for Developing Countries, International Mathematical Union, 2011-2014 and 2015-2018.



Member, Selection Committee, Abel Visiting Scholarship Programme, 2013-2016.

Member, Steering Board, Indo-French Centre for Applied Mathematics (IF-CAM).

**Visitor's Nominee**, Selection Board for Academic Staff, Department of Mathematics, Indian Institute of Technology (IIT), Guwahati, 2015-2018.

Member, Editorial Board, Proceedings of the Indian Academy of Sciences (Mathematical Sciences).

## 6. CONFERENCES

a. I have delivered invited and plenary addresses at several national and international conferences held in India and abroad.

b. 1. Was one of the organizers of the Indo-French Instructional Conference and Symposium held at Bangalore, India, 1986.

2. Organized the Summer Programme under the NBHM Nurture Programme, June-July, 1996.

3. Was one of the Organizers of the Instructional Conference on Nonlinear Functional Analysis (sponsored by the NBHM) held at the Institute of Mathematical Sciences, Madras, Feb. 1997.

4. Organized the Summer Programme under the NBHM Nurture Programme, June - July, 1997.

5. Organized the Summer Programme under the NBHM Nurture Programme, June - July, 1998.

6. Organized the Summer Programme under the NBHM Nurture Programme, June - July, 1999.

7. Organized the Summer Programme under the NBHM Nurture Programme, June - July, 2001.

8. Organized the Summer Programme under the NBHM Nurture Programme, June - July, 2002.

9. Organized the Summer Programme under the NBHM Nurture Programme, July, 2003.

10. Organized a two day workshop on 'Perspectives in Mathematics' under the Platinum Jubilee Celebrations of the National Academy of Sciences, India at the Institute of Mathematical Sciences, Chennai, on September 30 and October 1, 2005.

c. I have been a **Resource Person** for numerous workshops and instructional conferences held in India.

d. Delivered a series of lectures on *Symmetrization and Applications to Partial Differential Equations*, under the **P. K. Menon Memorial Endowment Lectures**, Department of Mathematics, Calicut University, November, 1999.

## 7. VISITS ABROAD

1. ICTP, Trieste, Italy, to participate in the Autumn Course on the Applications of Analysis to Mechanics, 1976.
2. INRIA, Le Chesnay, France, from 1976-79 and worked for the degree of *Docteur-es-Sciences* which was awarded by the Université de Paris VI.
3. INRIA, Le Chesnay, France, under the Indo-French Exchange Programme, 1983.
4. ICTP, Trieste, Italy, to participate in the Autumn Course on Semigroups and Applications, 1984.
5. ICTP, Trieste, Italy, to participate in the follow-up Workshop on Semigroups and Applications, 1985.
6. ICTP, Trieste, Italy, to participate in the College on Variational Problems in Analysis, 1988.
7. INRIA, Le Chesnay, France, under the Indo-French Exchange Programme, 1988.
8. Université de Paris VI, Paris, France, as **Visiting Professor**, 1989-90.
9. Università degli Studi di Napoli, Federico II, Naples, Italy, as **Visiting Professor**, 1992.
10. Università degli Studi di Roma, La Sapienza, Rome, Italy, as **Visiting Professor**, 1992.
11. Université de Metz, Metz, France, as **Visiting Professor**, 1993.
12. ICTP, Trieste, Italy, to participate in the School and Workshop on Variational and Local Methods in the Study of Hamiltonian Systems, 1994.
13. Università degli studi di Roma, La Sapienza, Rome, Italy, as **Visiting Professor**, 1994.
14. Université de Pierre et Marie Curie (Paris VI), France, as **Visiting Professor**, Jan.-Jul., 1995.
15. Université de Metz, Metz, France, as **Visiting Professor**, Sep. 1996 and under the Indo-French Project of the IFCPAR, New Delhi, Project No.1001-1, October, 1996.
16. Université de Metz, Metz, France, as **Visiting Professor**, May, 1998.
17. Università degli studi di Roma, La Sapienza, as **Visiting Professor**, October - December, 1998.
18. Université de Metz, Metz, France, as **Visiting Professor**, May, 2001.
19. Université de Metz, Metz, France, as **Visiting Professor**, October, 2001 - March, 2002.
20. Université de Metz, Metz, France, as **Visiting Professor**, October, 2002 - January, 2003.
21. University of Westminster, London, UK, under the INSA - Royal Society Exchange Programme, February, 2003.
22. The City University of Hong Kong, Hong Kong, October - November, 2004.
23. Université de Metz, Metz, France, as **Visiting Professor**, May, 2005.
24. Université Paul Sabatier, Toulouse, France, as **Visiting Professor**, May, 2008.
25. Université Paul Sabatier, Toulouse, France, as **Visiting Professor**,

April-May, 2014.

## 8. MEMBERSHIP IN SOCIETIES

1. Life Member, Indian Mathematical Society.
2. International Society for the Interaction of Mechanics and Mathematics (ISIMM).
3. Indian Society of Industrial and Applicable Mathematics (ISIAM).
4. American Mathematical Society.
5. Life Member, Ramanujan Mathematical Society.
6. Elected Fellow, Forum d'Analystes, Chennai.