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Seyed Mohammad Hosseini (Previously: M. Hosseini Ali Abadi)

Speciality: [Numerical Analysis](#)

Academic Status: [Professor](#)



PhD: [Imperial College, London University](#) (1988)

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Professional Experiences

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## Research Interests

### Numerical Analysis & Optimization

with development and application of

- Numerical methods for the solution of ordinary differential equations
- Numerical methods for the solution of partial differential equations
- Forward and inverse problems
- Approximation theory, Spectral methods
- Numerical methods for stochastic differential and integral equations

in

control, neural network, finance, image restoration

## Educations

1. Ph.D in Maths: Imperial College, University of London (1985-1988);  
Supervisor: Prof. E. L. Ortiz;
  - Title of Ph.D thesis: The Tau Method in the Numerical solution of differential inclusion and nonlinear partial differential equations .
2. MSc in Maths: with a mark of distinction, Chelsea (King's) College,  
University of London, (1983-1985); Supervisor: Dr. Dunnage;

- Title of MSc dissertation: Univalent functions on unit disc.  
(BSc/BA : Mathematics, Iran, 1980)

## Research Projects

1. A joint 4-year project with Azarbyjan Tarbiat Moalem Univ on some analytic and numerical investigation of Navier Stokes Equation, 01/01/2004 - 01/01/2008
2. A 2-year project on some improvements in numerical spectral method, using a grant from ISNF of Iran.
3. Grant from ISNF of Iran for Post Doc applications.

## Teaching Experience

Some of taught MSc and Ph.D Courses:

1. Advanced computational methods
2. Advanced Engineering Maths
3. Convex optimization
4. Advanced Numerical Analysis
5. Advanced Numerical Linear Algebra
6. Advanced Numerical Solution of ODEs
7. Advanced Numerical Solution of PDEs
8. Numerical solution of stochastic DEs
9. Approximation Theory
10. Special Topics in PDEs
11. Special Topics in Optimization
12. Special Topics in numerical methods for Stochastic DEs
13. Fourier Analysis and Wavelet with Applications
14. Boundary Value Problems

Some BSc Courses taught in other universities:

1. Mathematical Analysis I & II ,
2. Numerical Analysis I & II,
3. Calculus I & II , BSc
4. Functions of a complex variable,
5. Elementary Set Theory ,

## Books

1. Fourier series and boundary value problems (A translation), with A. Khosravi, ([translation 1997](#)) of the original book “[Fourier series and boundary value problems](#)”, by James Ward Brown & Ruel V. Churchill, 5th Ed. (level BS and first year graduates in Eng.)
2. Written (with M. Nikokar), Topics in operations research, 1998 (level BS)
3. A translation of Maple V, (with M. Nikokar), ([translation 1999](#)) of the original book “[Maple V](#), by K.M. Hill, M.L. Hansel, K.M. Ricard”
4. Written (with M. Nikokar and M. T. Darvishi), Discrete Mathematics, , 2000 (level BS)
5. A practical guide to pseudospectral methods, (A [translation 2000](#)) of the original book “[A practical guide to pseudospectral methods](#)”, by Bengt Fornberg (level MS and Ph.D)
6. Numerical methods for Applied Science, (A [translation 2002](#)) of the original book “[Numerical methods for Applied Science](#)”, by Allen Myron B. & Isaacson, Eli L. (level MS and Ph.D in Eng.

## International Journal papers

1. Hosseini Aliabadi, M., Ortiz, E.L., [1988](#), Numerical solution of feedback control systems equations, [Applied Mathematics Letters](#), Vol. 1, No. 1, pp. 3-6.
2. Hosseini Aliabadi, M., Ortiz, E.L., [1991](#), A Tau Method based on non-uniform space-time elements for the numerical simulation of solitons, [Computers and Mathematics with Applications](#), Vol. 22, No. 9, pp. 7-19.

3. Hosseini Aliabadi, M., Ortiz, E.L., 1991, 'The Algebraic Kernel Method for the numerical solution of partial differential equations, [Numerical Functional Analysis & Optimization](#), Vol. 12, No. 3, 4, pp. 339-360.
4. Hosseini Aliabadi, M., 1997, The PC-Tau Method for the solution of an isolated cosmic string, [Iranian Journal of Sciences](#), Vol. 8, No. 3, pp. 189-192
5. Hosseini Aliabadi, M., Ortiz, E.L., 1998, The Operational Tau Method in solving free and moving boundary value problems, [Computers and Mathematics with Applications](#), Vol. 35, No. 8, pp. 53-61.
6. Hosseini, S.M., Hojjati, G., 1999, Matrix free MEBDF method for the solution of stiff systems of ODEs, [Mathematical and Computer Modelling](#), Vol. 29, No. 4, pp. 67-77.
7. Kovalyov, M., Mohammad Hosseini Aliabadi, 1999, An explicit formula for a class of solutions of the KdV equation, [Physics Letters A](#), Vol. 254, pp. 47-52.
8. Hosseini, S.M., 2000, The application of the Operational Tau Method on some stiff systems of ODEs, [Inter. J. Appl. Math.](#), Vol. 2, No. 9, pp. 1027-1036.
9. Hosseini, S.M., 2000, The Buchstab's function and the Operational Tau Method, [Inter. Korean J. Comput. & Appl. Math](#), Vol. 7, No. 3, pp. 673 – 683.
10. Hosseini, S.M. 2000, Solving ODE BVPs using the perturbation term of the Tau Method over semi-infinite intervals, [Far East J. Appl. Math.](#), Vol. 4, No. 3, pp. 263 – 271.
11. Aliev N., Hosseini, S.M., 2000, A mixed parabolic problem with a non-local and global linear conditions, [Iranian Journal of Sciences](#), Vol. 11, No. 3, pp. 233-237.
12. Hosseini, S.M. and Aliev, N., 2001, A regularization of Fredholm type singular integral equations, [International Journal of Mathematics and Mathematical Sciences](#), Vol. 26, No. 2, pp. 123-128.

13. Shahmorad, S., Hosseini, S.M., 2002, A matrix formulation of the Tau method for Fredholm and Volterra linear integro-differential equations, [Inter. Korean J. Comput. & Appl. Math.](#), Vol. 9, No. 2, pp. 497-487
14. Aliev N., Hosseini, S.M., 2002, Cauchy Problem for the Navier-Stokes Equation and its Reduction to a non-linear System of second kind Fredholm Integral Equations, [International Journal of Pure and Applied Mathematics](#), Vol. 3, No. 3, pp. 317-324.
15. Hosseini, S.M., Aliev, N., 2002, An analysis of a parabolic problem with a general (non-local and global) supplementary linear conditions-I, [Italian Journal of Pure and Applied Math](#), No. 12, pp. 143-154.
16. Shahmorad, S., Hosseini, S.M., 2003, Numerical solution of a class of Integro-Differential equations by the Tau method with an error estimation, [Applied Mathematics and Computation](#), Vol. 136, No. 2-3, pp. 357-368.
17. Shahmorad, S., Hosseini, S.M., 2003, Tau numerical solution of Fredholm Integro-Differential equations with arbitrary polynomial base, [Applied Mathematical Modelling](#), Vol. 27, No. 2, pp. 145-154.
18. Hosseini, S.M., Aliev, N., 2003, An analysis of a parabolic problem with a general (non-local and global) supplementary linear conditions-II, [Italian Journal of Pure and Applied Math](#), Vol. 13, pp. 115-127.
19. Hosseini, S.M., Aliev, N., 2003, Multidimensional singular Fredholm Integral Equations in a finite domain and their regularization, [Southeast Asian Bulletin of Mathematics](#), Vol. 27, pp .395-408.
20. Hosseini, S.M., Aliev, N., 2004, Solution of the Ramanujan problem using fractional order derivative, [Southeast Asian Bulletin of Mathematics](#), Vol. 27, pp . 787-790.
21. Hosseini, S.M., Aliev, N., 2004, Sufficient conditions for the reduction of a BVP for PDE with non-local and global boundary conditions to Fredholm integral

equations (on a rectangular domain), [Applied Mathematics and Computation](#) Vol. 147, pp. 669-685.

22. Ghoreishi, F., Hosseini, S.M., 2004, A preconditioned implementation of pseudospectral methods on arbitrary grids, [Applied Mathematics and Computation](#), Vol. 148, pp. 15-34.
23. Ghoreishi, F., Hosseini, S.M., 2004, The Tau method and a new preconditioner, [Journal of Computational and Applied Mathematics](#), Vol. 163, pp. 351-379.
24. Hojjati, G., Rahimi, M.Y., Hosseini, S.M., 2004, A-EBDF: an adaptive method for numerical solution of stiff systems of ODEs, [Mathematics and Computers in Simulation](#), Vol. 66, No. 1, pp. 33-41.
25. Bahrami, F., Aliev, N., Hosseini, S.M., 2005, A method for the reduction of four dimensional mixed problems with general boundary conditions to a system of second kind Fredholm integral equations, [Italian Journal of Pure and Applied Math](#), Vol. 17, pp. 91-104.
26. Shahmorad, S., Hosseini, S.M., 2005, Numerical piecewise approximate solution of Fredholm integro-differential equations by the Tau method, [Applied Mathematical Modelling](#), Vol. 29, pp. 1005-1021 .
27. Hojjati, G., Rahimi, M.Y., Hosseini, S.M., 2006, New second derivative multistep methods for stiff systems, [Applied Mathematical Modelling](#), Vol. 30, pp. 466-476.
28. Rezhghi, M., Hosseini, S.M., 2006, An ILU preconditioner for nonsymmetric positive definite matrices by using the conjugate Gram-Schmidt process, [Journal of Computational and Applied Mathematics](#), Vol. 188, pp. 150-164.
29. Mokarram, M., Hosseini, S. M., 2006, Comparison of a higher order method and the simple upwind and non-monotone methods for singularly perturbed boundary value problems, [Applied Mathematics and Computation](#), Vol. 182, No.1, pp . 460-473.

30. Bagheroskoui, M., Hosseini, S.M., 2007, Investigation of a preconditioner for the P2-P1 finite element solution of Stokes problem, [Applied Mathematics and Computation](#), Vol. 186, No. 1, pp . 490-495.
31. Foroush Bastani, A., Hosseini, S.M., 2007, A new adaptive Runge-Kutta method for stochastic differential equations, [Journal of Computational and Applied Mathematics](#), Vol. 206, pp. 631-644.
32. Ghoreishi, F., Hosseini, S.M., 2008, Integration matrix on arbitrary grids with a preconditioner for pseudospectral method, [Journal of Computational and Applied Mathematics](#), Vol. 214, No. 1, pp . 274-287.
33. Abdi, Ali, Hosseini, S.M., 2008, An investigation of resolution of 2-variate Gibbs phenomenon, [Applied Mathematics and Computation](#), Vol. 203, No. 2, pp . 714-732.
34. Mokhtary, P., Hosseini, S.M., 2008, Rescale and modify implementation of IRKS methods, [Numerical Algorithms](#), Vol. 47, No. 4, pp. 315-325.
35. Mokhtary, P., Hosseini, S.M., 2008, Some implementation aspects of the general linear methods with inherent Runge-Kutta stability, [Iranian J. Math. Sci. Informatics](#), Vol. 3, No.1, pp. 63-76.
36. Farzi, J., Hosseini, S.M., 2009, A high order method for the solution of a one-way wave equation in heterogeneous media, [Far East J. Appl. Math.](#), Vol. 36, No. 3, pp. 317-330.
37. Bastani, A.F., Hosseini, S.M., 2009, On mean-square stability properties of a new adaptive stochastic Runge-Kutta method, [Journal of Computational and Applied Mathematics.](#), Vol. 224, pp. 556-564.
38. Hosseini, S.M., 2009, The adaptive operational Tau method for systems of ODEs, [Journal of Computational and Applied Mathematics.](#), Vol. 231, pp. 24-38.
39. Bakhoday , M., Nabati, R., Hosseini, S.M., 2009, A hybrid method based on the Taylor series and finite elements for solving one dimensional Burgers' equations, [Italian J. Appl. And Pure Math.](#), Vol. 25, pp 109-122.



40. Rezaghi, M., Hosseini, S.M., 2009, A new variant of L-curve for Tikhonov regularization, [Journal of Computational and Applied Mathematics](#), Vol. 231, pp. 914-924.
41. Jahanshahi, M., Aliev, N., Hosseini, S.M., 2009, An analytic method for investigation and solving two-dimensional steady state Navier-Stokes equations (I), [Southeast Asian Bulletin of Mathematics](#), Vol. 33, pp. 1075-1089.
42. Nobari, E., Hosseini, S.M., 2010, A method for approximation of the exponential map in semidirect product of matrix Lie groups and some applications, [Journal of Computational and Applied Mathematics](#), Vol. 234, pp 305-315.
43. Amiri, S., Hosseini, S.M., 2010, Second-order method for solving 2D nonlinear parabolic differential equations based on ADI method, [International J. Modeling, Simulation, and scientific Computing](#), Vol. 1, No. 1, pp 133-146.
44. Kamrani, M., Hosseini, S.M., 2010, The role of coefficients of a general SPDE on the stability and convergence of a finite difference method, [Journal of Computational and Applied Mathematics](#), Vol. 234, pp 1426-1434.
45. Valinejad, A., Hosseini, S.M., 2010, A variable step-size control algorithm for the weak approximation of stochastic differential equations, [Numerical Algorithms](#), Vol. 55, pp. 429-446.
46. Rezaghi, M., Hosseini, S.M., 2010, Lanczos based preconditioner for discrete ill-posed problems, [Computing](#), Vol 88, No. 1-2, pp. 79-96.
47. Hajipour, M., Hosseini, S.M., 2011, The performance of a Tau preconditioner on systems of ODEs, [Applied Mathematical Modelling](#), Vol. 35, pp. 80-92.
48. Haghighi, A., Hosseini, S.M., 2011, On the stability of some second order numerical methods for weak approximation of Ito SDEs, [Numerical Algorithms](#), Vol. 57, No. 1, pp. 101-124.
49. Nobary, E., Hosseini, S.M., 2011, Stability of the generalized polar decomposition method for the approximation of the matrix exponential, [Journal of Generalized Lie Theory and Applications](#), Vol. 5, Article ID G090901.

50. Gholami, A., Hosseini, S.M., 2011, A general framework for sparsity-based denoising and inversion, [IEEE Transactions on Signal Processing](#), Vol. 59, No. 11, pp. 5202-5211.
51. Valinejad, A., Hosseini, S.M., 2012, A stepsize control algorithm for SDEs with small noise based on stochastic Runge-Kutta Maruyama methods, [Numerical Algorithms](#), Vol. 61, No. 3, pp. 479-498.
52. Haghghi A., Hosseini, S.M., 2012, A class of split-step balanced methods for stiff stochastic differential equations, [Numerical Algorithms](#), Vol. 61, No.1, pp. 141-162.
53. Kamrani, M., Hosseini, S.M., 2012, Spectral collocation method for stochastic Burgers equation driven by additive noise, [Mathematics and Computers in Simulation](#), Vol. 82, No. 9, pp. 1630-1644.
54. Abdi, M.J., Hosseini, S.M., Rezghi, M., 2012, A novel weighted support vector machine based on particle swarm optimization for gene selection and tumor classification, [Computational and Mathematical Methods in Medicine](#), Vol. 2012, Article ID 320698.
55. Asgari, Z. Hosseini S.M., 2013, Numerical solution of two-dimensional Sine-Gordon and MBE models using Fourier spectral and high order explicit time stepping methods, [Computer Physics Communications](#), Vol. 184, NO. 3, pp. 565-572.
56. Blomker, D., Kamrani, M., Hosseini, S.M., 2013, Full discretization of the stochastic Burgers equation with correlated noise, [IMA Journal of Numerical Analysis](#), Vol. 33, No. 3, pp. 825-848.
57. Hosseini, A., Hosseini, S.M., 2013, A new steepest Descent differential inclusion-based Method for solving general nonsmooth convex optimization problems, [Journal of Optimization Theory and Applications](#), Vol. 159, No. 3. pp.698-720.

58. Hosseini, A., Hosseini, S.M., Soleimani-damaneh, M., 2013, A differential inclusion-based approach for solving nonsmooth convex optimization problems, [Optimization](#), Vol. 62, No. 9, pp. 1203-1226.
59. Gholami, A. and Hosseini, S.M., 2013, A balanced combination of Tikhonov and total variation regularizations for reconstruction of piecewise-smooth signals, [Signal Processing](#), Vol. 93, No. 7, pp. 1945-1960.
60. Hosseini, A., Wang, Jun., Hosseini, S.M., 2013, A recurrent neural network for solving a class of generalized convex optimization problems, [Neural Networks](#), Vol. 44, No. 8., pp. 78-86.
61. Hosseini, S.M., Ghaffari, Rezvan, 2014, polynomial and nonpolynomial spline methods for fractional sub-diffusion equations, [Applied Mathematical Modelling](#), Vol. 38, pp. 3554-3566.
62. Farzi, J., Hosseini, S.M., 2014, High order immersed interface method for acoustic wave equation with discontinuous coefficients, [Iranian Journal of Numerical Analysis and Optimization](#), Vol. 4, No. 1, pp. 1-24.
63. Haghghi, A., Hosseini, S.M., 2014, Analysis of asymptotic mean-square stability of a class of Runge-Kutta schemes for linear systems of stochastic differential equations, [Mathematics and Computers in Simulation](#), Vol. 105, pp. 17-48.
64. Ghaffari, R., Hosseini, S.M., 2014, Obtaining artificial boundary conditions for fractional sub-diffusion equation on space two-dimensional unbounded domains, [Computers and Mathematics with Applications](#), Vol. 68, No.1-2, pp. 13-26.
65. Ghayebi, B., Hosseini, S.M., 2014, A simplified Milstein scheme for SPDEs with multiplicative noise, [Abstract and Applied Analysis](#), article ID 140849.
66. Rezaghi, M., Hosseini, S.M., Lars Elden, 2014, Best Kronecker product approximation of the blurring operator in three dimensional image restoration problems, [SIAM J. Matrix Anal. Appl.](#), Vol. 35, No. 3, pp. 1086-1104.

67. Amiri, S., Hosseini, S. M., 2015, A class of weak second order split-drift stochastic Runge Kutta schemes for stiff SDE systems, [Journal of Computational and Applied Mathematics](#), Vol. 275, pp. 27-43.
68. Hosseini, S.M., Smaeili, S., 2015, Numerical integration of multi-dimensional highly oscillatory integrals, based on eRPIM, [Numerical Algorithms](#), Vol. 68, No. 2, pp. 423-442.
69. Jafari-Varzaneh, H.A., Hosseini, S.M., 2015, A new map for the Chebyshev pseudospectral solution of differential equations with large gradients, [Numerical Algorithms](#), Vol. 69, No. 1, pp. 95-108.
70. Amiri, S., Hosseini, S. M., 2015, A class of balanced stochastic Runge-Kutta methods for stiff SDE systems, [Numerical Algorithms](#), Vol. 69, No. 3, pp. 531-552.
71. Amiri, S., Hosseini, S.M., Rossler, A., 2016, Diagonally drift-implicit Runge-Kutta methods of strong order one for stiff stochastic differential systems, [Journal of Computational and Applied Mathematics](#), Vol. 293, pp. 82-93.
72. Fatemion Aghda, A.S., Hosseini, S.M., 2016, Linear mean-square stability properties of semi-implicit weak order 2.0 Taylor schemes for systems of stochastic differential equations, [Journal of Computational and Applied Mathematics](#), Vol. 302, pp. 94-105.
73. Nasrollahzadeh, F., Hosseini, S.M., 2016, An Implicit Difference-ADI Method for the Two-dimensional Space-time Fractional Diffusion Equation, [Iranian Journal of Mathematical Sciences and Informatics](#), Vol. 11, No. 2, pp. 71-86.
74. Vakili, N., Rezaghi, M., Hosseini, S.M., 2016, Improving image segmentation by using energy function based on mixture of Gaussian pre-processing, [J. Visual Communication & Image Representation](#), Vol. 41, pp. 239-246.
75. Ghayebi, B., Hosseini, S.M., Blomker, D., 2017, Numerical solution of the Burgers equation with Neumann boundary noise, [Journal of Computational and Applied Mathematics](#), Vol. 311, pp. 148-164.
76. Amiri, S., Hosseini, S.M., 2017, Stochastic Runge-Kutta Rosenbrock type methods for SDE systems, [Applied Numerical Mathematics](#), Vol. 115, pp. 1-15.
77. Fatemion Aghda, A.S., Hosseini, S.M., Tahmasebi, M., 2017, Analysis of non-negativity and convergence of solution of the balanced implicit method for delay

- Cox-Ingersoll-Ross model, [Applied Numerical Mathematics](#), Vol. 118, pp. 249-265.
78. Hosseini, S.M., Asgari, Z., [2017](#), Solution of stochastic nonlinear time fractional PDEs using polynomial chaos expansion combined with an exponential integrator, [Computers and Mathematics with Applications](#), Vol. 73, pp. 997-1007.
  79. Ejlali, N., Hosseini, S.M., [2017](#), A pseudospectral method for fractional optimal control problems, [Journal of Optimization Theory and Applications](#), Vol. 174, No. 1, pp. 83-107.
  80. Asgari, Z., Hosseini, S.M., [2018](#), Efficient numerical schemes for the solution of generalized time fractional Burgers type equations, [Numerical Algorithms](#), Vol. 77, pp. 763-792.
  81. Kamrani M., Hosseini, S.M., Hausenblas, E., [2018](#), Implicit Euler method for numerical solution of nonlinear stochastic partial differential equations with multiplicative trace class noise, [Mathematical Methods in the Applied Sciences](#), Vol. 41 (13), pp. 4986-5002.
  82. Ejlali, E., Hosseini, S.M., Yousefi, S.A., [2018](#), B-spline spectral method for constrained fractional optimal control problems, [Mathematical Methods in the Applied Sciences](#), Vol. 41 (14), 5466-5480.
  83. Asgari, Z., Hosseini, S.M., [2018](#), Convergence of a method based on the exponential integrator and Fourier spectral discretization for stiff stochastic PDEs, [Mathematical Methods in the Applied Sciences](#), Vol. 41 (17), pp. 8294-8314.
  84. Fatemion Aghda, A.S., Hosseini, S.M., Tahmasebi, M., [2018](#), Convergence and non-negativity preserving of the solution of balanced method for the delay CIR model with jump, [Journal of Computational and Applied Mathematics](#), Vol. 344, pp. 676-690.
  85. Davoudi, R., Hosseini, S.M., [2019](#), A semidefinite programming approach for polynomial switched optimal control problems, [Optimal Control Applications and Methods](#), Vol. 40, No. 4, pp. 626-646.

86. Tavakkol, E., Hosseini, S.M., Hosseini, A.R., 2019, A new regularization term based on second order total generalized variation for image denoising problems, *Iranian Journal of Numerical Analysis and Optimization*, Vol. 9, No. 2, pp. 141-163.
87. Ahmadi, Z., Hosseini, S.M., Bastani, A.F., 2020, A lattice-based approach to option and bond valuation under mean-reverting regime-switching diffusion processes, *Journal of Computational and Applied Mathematics*, Vol. 363, pp. 156-170.
88. Ejlali, N., Hosseini, S.M., 2020, Adaptive control parameterization method by density functions for optimal control problems, *IMA Journal of Mathematical Control and Information*, Vol. 37, No. 2, pp. 497-512.
89. Lotfi, M., Hosseini, S.M., 2020, An efficient Dai–Liao type conjugate gradient method by reformulating the CG parameter in the search direction equation, *Journal of Computational and Applied Mathematics*, Vol. 371, No.C, 112708.
90. Shayegan, A.H.S., Zakeri, A., Hosseini, S.M., 2020, A numerical method for solving two-dimensional nonlinear parabolic problems based on a preconditioning operator, *Mathematical Modelling and Analysis*, Vol. 25, No. 4, pp. 531-545.
91. Ahmadi, Z., Hosseini, S.M., Bastani, A.F., 2021, A new lattice-based scheme for swing option pricing under mean-reverting regime-switching jump-diffusion processes, *Journal of Computational and Applied Mathematics*, Vol. 383, pp. 113-132.
92. Almani, H.M., Hosseini, S.M., Tahmasebi, M., 2021, Fractional Brownian motion with two-variable Hurst exponent, *Journal of Computational and Applied Mathematics*, Vol. 388, 113262.
93. Khoeiniha, N., Hosseini, S.M., Davoudi, R., 2021, Trainable fourth-order partial differential equations for image noise removal, *Iranian Journal of Numerical Analysis and Optimization*, Vol. 11, No. 2, pp. 235-260.
94. Sayyar, G., Hosseini, S.M., Mostajeran, F., 2021, A high-order scheme for time-space fractional diffusion equations with Caputo-Riesz derivatives, *Computers & Mathematics with Applications*, Vol. 104, pp. 34-43.
95. Tavakkol, E., Hosseini, S.M., Hosseini, A., 2022, Image denoising via a new hybrid TGV model based on Shannon interpolation, *Iranian Journal of Numerical Analysis and Optimization*, Vol. 12, No. 2, pp. 371-396.
96. Davoudi, R., Hosseini, S.M., Ramezani, A., 2022, A Numerical Approach for Stochastic Switched Polynomial Optimal Control and Approximating Control Lyapunov Functions, *Iranian Journal of Science and Technology, Transactions A: Science* Vol. 46, No. 2, pp. 563-582.

97. Tavakkol, E., Dong, Y., Hosseini, S.M., 2022, Image Denoising Via Spatially Adaptive Directional Total Generalized Variation, [Iranian Journal of Science and Technology, Transactions A: Science](#) Vol. 46, No. 4, pp. 1283-1294.
98. Eftekhari, T., Hosseini, S.M., 2022, A new and efficient approach for solving linear and nonlinear time-fractional diffusion equations of distributed order, [Computational and Applied Mathematics](#), Vol. 41, No. 6, Article 281.
99. Lotfi, M., Hosseini, S.M., 2022, An efficient hybrid conjugate gradient method with sufficient descent property for unconstrained optimization, [Optimization Methods and Software](#), Vol. 37, No. 5, pp. 1725-1739.

### **Membership in Societies**

1. American Mathematical Society
2. Iranian Mathematical Society
3. Iranian Statistical Society

### **Journal Editorial Collaboration**

1. Far East Journal of applied Math, India, As an editor
2. Mathematical Sciences, Iran, (Springer), As an Editor
3. Iranian journal of mathematical Sciences and Informatics, Iran, As an Editor
4. AMS reviewer
5. reviewing some papers of Elsevier and Springer and other publishers

### **Ph.D Supervised**

1. S. Shahmorad (2002), '*Tau numerical method for the solution of Integro-Differential Equations*', (Currently a Faculty member of [Tabriz University](#)).
2. F. Ghoreishi (2004), '*The Tau method and a new preconditioner*', (Currently a Faculty member of [Toosi University](#)).

3. Ali Foroush Bastani May (2008), '*Adaptive Runge-Kutta methods for stochastic differential equations*', (Currently a Faculty member of Institute for Advanced Studies in Basic Sciences)
4. Javad Farzi (2009), '*Finite difference methods for wave equation with discontinuous coefficients*'; (Currently a Faculty member of Sahand University of Technology)
5. Mansoor Rezghi (2009), '*Regularization and preconditioning of Large Scale Ill-conditioned Problems*'; (Currently a Faculty member of Tarbiat Modares University).
6. StudeElham Nobari (2010) '*Some numerical methods for ODEs on some classes of Lie groups*' (Currently a Faculty member of University of Science and Technology of Mazandaran).
7. Azizollah Valinejad (2012) '*Adaptive method for stochastic differential equations with small noise*' (Currently a Faculty member of University of Mazandaran).
8. Minoo Kamrani (2012) '*Analysis of spectral collocation method and a class of finite difference methods for a class of parabolic stochastic partial differential equations*' (Currently a Faculty member of Razi University).
9. Amir Haghghi (2013) '*An analysis of mean square stability of a class of Runge-Kutta methods for solving stochastic differential systems*' (Currently a Faculty member of Razi University).
10. Alireza Hosseini (2013) '*Designing differential inclusion-based neural networks for solving regular non-smooth programming problems*' (Currently a Faculty member of University of Tehran).
11. Sadegh Amiri (2014) '*Introducing a class of weak semi-implicit methods for solving stiff systems of stochastic differential equations with analysis of mean square stability*'; (Currently a Faculty member of Aeronautical University of Science and Tech.).



12. Bakhtiar Gayebi (2015); *Analysis of a family of implicit numerical methods for SPDEs of the Glaerkin-Milstein type with multiplicative noise*; Currently a Faculty member of IAU-Qazvin Branch).
13. Ashrafsadat Fatemion Aghda (2017), *Stability of Taylor schemes and non-negativity of the solution of the balanced implicit method for stochastic differential equations with delay*.

(To be added some more )

### Research visits

- 1- Visiting ICTP, participating the workshop on micro local analysis and PDE Sept. 1995,
- 1- Research visiting professor in the Department of Mathematics, University of Alberta, 1998, 1st Jan - 15th July1998,
- 2- Visiting ICTP, ICTP-INFM Summer School on Transport, Reaction and Propagation in Fluids and Conference on Kolmogorov's Legacy in Physics, 8-17, Sept. 2003

### Professional Experiences

1. Faculty Vice president in research, 03/06/1989 - 09/06/1996
2. University Education general manager, 09/06/1996 - 09/06/1997
3. University Promotion Committee, 07/07/2000 - 07/07/2004, Two consecutive periods of promotion committee
4. Basic Science sub-committee for promotion, 01/09/2004 - 07/08/2006
5. University Promotion Committee, 07/08/2006 –
6. University Promotion Committee Secretary, 2006-2008+

**National Journal papers (Persian):**

1. Jafari, M., Hosseini, S.M., 2004, 'Stability Analysis of a model for the spread of HIV/AIDS epidemic', Amirkabir J. Science & Tech, Vol. 60-61, No. 15, pp .(article in Persian abstract in English)
2. Eisa Firuz and Hosseini, S.M. 2006, ' Discrete non-local boundary condition for parabolic approximations in underwater acoustics', Amirkabir J. Science & Tech, pp .(article in Persian abstract in English)
3. M. Barfeie, S.M. Hosseini, 2007, 'Navier-Stokes equations as differential-algebraic equations and their numerical solutions with sequential regularization method, J. Science Univ. Tehran, Vol 33, No 3. (article in Persian abstract in English)
4. S.M. Hosseini, L. Sharafiyani-Cigaroody, 2007, ' Numerical solution of nonlinear Schrodinger equation and investigation of singular solutions, J. Science Univ. Tehran, Vol 33, No 3. (article in Persian abstract in English)
5. M. Bagherpoorfard and S.M. Hosseini 2008, 'Using multi level preconditioners on unstructured grids in elliptic boundary value problems', Amirkabir J. Science & Technology, Vol. 67, No. 18, pp . published 2007(in persian) English Abstract
- 6- S.M. Hosseini and M. Rostami, 2009, ' Analysis of air pollution transition models and methods of solving', Amirkabir J. Science & Technology, Vol 70, pp. 1-8 (in Persian) English Abstract.

- 7- S.M. Hosseini and M. Samsami, 2009, 'Defect control for RK methods using computed interpolation', Amirkabir J. Science & Technology, Vol 70, pp. 19-26 (in Persian) English Abstract.
- 8- S.M. Hosseini and M. Khairmand, 2009,' Analysis of split step method on Maxwell's equations and generalized nonlinear schrodinger equations', Amirkabir J. Science & Technology, Vol 70, pp. 23-41, (in Persian) English Abstract.
- 9- M. Lotfi Honiandari and S.M. Hosseini, 2014, 'Analysis of Split Bergman Method for Solving the Optimal Control problem with Elliptic Partial Differential Equation Constraint', Journal of Science, Kharazmi University, Vol. 14, No. 2, (in Persian) English Abst.

### **International Conferences ( some of many )**

1. with E. L. Ortiz , “On the numerical behavior of different formulations of the Tau Method for the treatment of differential inclusions, Proc”, 2nd, Int. Symp. Numer. Analysis, Prague, Prague , pp. (1988), pp. 162-174
2. with Mohsen-alhosseini , “The PC-Tau Method for the numerical solution of singularly perturbed ODEs, Invited lectures delivered “, VII-th Int. Colloquium on Differential Equations, Plovdiv, Bulgaria, Plovdiv, Bulgaria, Volume II, Editor: A. Dishliev, Academic Publications, (1996), Bulgaria , pp. 55-62
3. “The application of the operational Tau Method on some stiff systems of ODEs,“, 10th Colloquium on Differential Equations Plovdiv, Bulgaria, Plovdiv, Bulgaria, (1999) , pp .
4. with N. Aliev , “A parabolic problem with a general (non-local and global) supplementary linear conditions”, ICMP 2000, Imperial College, London" , "ICMP 2000, Imperial College, London, pp .

5. “The Tau method and a new preconditioner”, 11th Inter. Colloquium on numerical analysis and computer, Plovdiv, Bulgaria, Plovdiv, Bulgaria, (2002), Bulgaria , pp .
6. with N. Aliev and Jahanshahi , “An analytical-numerical method for investigation and solving 3D steady state Navier Stokes equations”, 2nd Inter. Conf. Applied Math., Plovdiv, Bulgaria, Plovdiv, Bulgaria, Aug. (2005) , pp .
7. with N. Aliev and Jhanshahi , “An analytic-numerical method for solving two-dimensional Navier Stokes system”, Dynamical systems and applications, Antalya, Turkey , 5-10 July (2004), Antalya, Turkey , pp .
8. with F. Ghoreishi , “A preconditioned pseudospectral method for Fredholm Integro-Differential Equations using arbitrary grids, Modelling “, The third IMACS conference on mathematical Modelling and computational methods in Applied sciences and Engineering, Pilsen, Czech Republic, Pilsen, 4-8 July (2005), Czech Republic , pp .
9. “The adaptive Tau Method (2007)’ ICIAM 2007, Zorich, Swiss.
10. With Taghizadeh, Karimi, “Basic topic in adapted BDF and MEBDF methods (2010)” The 23<sup>rd</sup> inter. Conf. of Jangjeon Math Socitey.
11. A semidefinite programming approach for stochastic switched optimal control problems
- 12.R Davoudi, SM Hosseini, A Ramezani, 2019, A semidefinite programming approach for stochastic switched optimal control

problems, [IEEE 58th Conference on Decision and Control \(CDC\)](#),  
2503-2508

13.

### **National Conferences ( some of many )**

1. .... “The behavior of the Operational Tau Method on the numerical solution of a non-linear two-degree-of-freedom system in aeroelasticity”, The second seminar on Numerical Analysis and its applications, Imam Hossein Univ., Tehran -Iran, 27-29 Jan. (1999),
2. with I. Gholampoor and N. Aliev, “A composed method for the approximate solution of backward parabolic problems”, Proceeding of 31st Iranian Math. Confer, 31st Iranian Math. Confer. (2000), pp. 3-12
3. with Abbasi , “Pseudospectral method and Splitting techniques for the solution of unsteady Stokes equations”, 2nd Inter. Conference on Appl. Math., Iran Univ. of Science and Tech, Iran Univ. of Science and Tech.,(2000) (Persian)
4. with Poor-rahimi and Aliev , “ A boundary value second order integro-differential problem and the necessary conditions”, 2nd Inter. Conference on Appl. Math., Iran Univ. of Science and Tech.}(2000), (Persian),
5. with Shahmorad and Mirnia , “Using the QR method in solving linear systems of equations with a particular block matrix

- coefficient”, The second Iranian Seminar on Linear Algebra and its application, Persian Golf Univ, (2001)" (Persian), .
6. with Amer-Kaabi , “Increasing the rate of convergence in the conjugate gradients method using block preconditioners (an application in PDEs)“, The second Iranian Seminar on Linear Algebra and its application, Persian Golf Univ, (2001)" (Persian) .
  7. with Haj-bagheri , “Symplectic methods for the solution of Odes”, Inter. Confer. on Ghasaddin Jamshid Kashani, Iran, Jamshid Kashani, (2001), (Persian),
  8. with Poorbashash , “ Investigating the solution of elliptic BVPs by the spectral methods and the resulting systems of equations”, 32nd Iranian Math. Conf., Babolsar-Iran, 32nd Iranian Math. Conf., 27-30 Aug. (2001)", (Persian) .
  9. with Shahmorad, “Using piecewise approximations in numerical solution of Fredholm integro-differential equations by the Tau method”, 33rd Iranian Math. Conf. Mashhad Univ, Conf., Aug. 30 - Sept. 2, (2002) .
  10. with Karimpoor and Sepehri , “with Karimpoor and Sepehri, Locomotive scheduling problem in time management of railway network”, 2nd international railway conference, Iran , 2nd international railway conference, (2002), (Persian),
  11. with Bakhodai and Khodayari, “Parabolic equation methods with wavelet differential forms in modeling acoustic wave in sea”, 2nd national under sea science and tech. conference, Malekashtar Thech. Univ, Malekashtar Thech. Univ. (2003) (persian),
  12. with Shahmorad 2000, “Numerical solution of a class of Integro-differential equations by the Tau method”, "3rd Conference on Numerical Analysis and its application, Zahedan , Zahedan (2000), Iran, pp .

13. with Bagher-Oskoi, "Suitable preconditioners for Stocks equations", 34th Iranian Math. Conf., Shahrood , Sept. 2, (2003) Shahrood (Persian),
14. with Bakhodai, "Optimizing grid points in finite difference and the method of wavelet for Bergers equation", 34th Iranian Math. Conf., Shahrood , (2003) Shahrood (Persian).
15. with J. Farzi , "Extrapolation methods for linear integral equations", 35th Iranian Math. Conf., Ahvaz Univ, winter (2005), Ahvaz Univ.(Persian),
16. with M. Rezghi, "An ILU preconditioner based on Conjugate Gram-Schmidt process for positive definite linear systems", 35th Iranian Math. Conf., Ahvaz Univ, (2005), (Persian).
17. with A. Forosh Bastani, "Solving Stochastic ordinary differential equations with adaptive methods", 35th Iranian Math. Conf., Ahvaz Univ, Iranian Math. Conf .(2005), Univ.(Persian) ,
18. with L. Sharafian, " Numerical solution of non linear Schrodinger equation and singular bahavior of its solution", 36th Iranian Math. Conf., , Yazd Univ, summer (2005), (Persian),
19. with M. Bagherpoor , " Investigating two multi-level preconditioners for 2D second order elliptic boundary value problems", 36th Iranian Math. Conf., Yazd Univ, Summer (2005), (Persian) .
20. with M. Mokarram, " Singularly perturbed elliptic and parabolic boundary value problems with a comparison of uniform and non-uniform meshes", 7th seminar on Differential equations and dynamical systems, Tabriz Univ., Tabriz Univ. Fall (2005),
21. With J. Farzi, "Numerical Solution of Linear Hyperbolic with Interface", 37th Annual Iranian Mathematics Conference, 2-5 September (2006), (English), pp. 508-511

22. With M. Jahanshahi and N. Alive, “An Analytical Method for Investigation and solving Three Dimensional Steady State Navier-Stokes Equations (II)” 37th Annual Iranian Mathematics Conference, 2-5 September (2006), (English), pp. 321-323
23. With S. Amiri, “Numerical Solution of 2D Unsteady Nonlinear Parabolic Differential Equations”, 40th Annual Iranian Mathematics Conference , 7-20 August (2009) Sharif Univ., (Persian), .
24. With P. Mokhtari, “Basic topics in general linear methods with Inherent Runge-Kutta stability for ODEs”, 40th Annual Iranian Mathematics Conference, 7-20 August (2009) Sharif Univ., (English), .
25. With Y. Behrouzi, “adaptive semi-implicit Runge-Kutta method with iterative Guss-Seidel”, 40th Annual Iranian Mathematics Conference , 7-20 August (2009) Sharif Univ., (Persian),

**MSc students supervised: (Some of many) (all in Persian)**

1. Mozhgan Ehtesham, “Chebyshev-Legendere Method for Numerical Solution of partial differential equations (1997)”
2. Amer Kaabi, “Block Preconditioning for the conjugate gradient method and its application (1997)”



3. Mohammad Javidy, "Numerical Solution of Partial Differential Equation with the Method of Lines (1997)"
4. Golamreza Hojjati, "Matrix free Methods for numerical solution of stiff systems of ODEs (1997)"
5. Abolfazl Tari Marzabad, "Estimation of Error Generated from Approximation of coefficient of Ordinary Differential Equation in there solution (1997)"
6. Ali Tahmasbi, "Operational Tau Method for numerical solution of system of Ordinary Differential Equations (1997)"
7. Zeinolabedin Dehghani Abyaneh, "Recursive Tau Method for numerical solution of ODEs (Free boundary problems) (1995)"
8. Seied Ali Mohammad Mohsen Al Hosseini, "Operation Tau Method for numerical solution of ODEs (Singular Perturbation) (1995)"
9. Leila Hossein Kazemi, "Integration Preconditioning of pseudo spectral operators and differential operators (2001)"
10. Iraj Gholampour Ijani, "A Kernel-Based Method for the approximate solution of backward parabolic peoblems (1999)"
11. Isa Abbasi, "Splitting Techniques for the unsteady stokes equation (2000)",
12. Nasrin Hajibaghery, "Hamiltonian System and Symplectic Methods for solving them and its application in Sine-Gordon problem (2001)"
13. Hossein Abbasali Pour Bashash, "Algebraic Systems of Spectral Method and an Analysis of Some Suitable Algorithms (2001)"
14. A. Dayyani, " Approximation of functions by wavelets and their asymptotic expansion and their application in compression (2001)"
15. S.M. Hashemi Karoee, "On bivariate Lagrange and Hermite interpolation with minimal degree polynomials (2002)"
16. Mostafa Bakhoday Paskyabi, "Wavelet Galerkin and finite element methods for solving PDEs and it applications (2002)"

17. Habib Allah Ejdahacosh, "Designing the mathematical model for costing bank products (based on DEA technique) (2002)"
18. M. Jafari, "Analysis stability and numerical and Analytic solution to Compartmented Method of the HIV/AIDS (2003)"
19. Jafar Bagheri, "A mathematical modeling of wound healing upon Lotka-Volterra equation with chemotaxis (2003)"
20. M. Bagher Oskooi, "New preconditioners for numerical solution incompressible Navier Stokes equation (2004)"
21. Isa Firouz Kasin, "parabolic solution techniques in modeling of ocean acoustic propagation (2004)"
22. M. Rezghi, "An incomplete factorization preconditioner based on A-Orthogonalization process for linear systems (2004)"
23. Mahmood Rostami, "Analysis of air pollution models and methods of solving (2005)"
24. Ramaz Nabati, "Iterative algorithms for solution of stokes equations using  $p_1^+ - p_0$  and  $p_2^+ - p_1$  finite element discretization (2005)"
25. Ladan Sharafiyani Cigaroodi, "The investigation of Focusing-Defocusing Oscillations of Schrodinger Equation (2005)"
26. Maryam Bazayr, "Finite element with moving grids for the numerical solution of PDE systems (2005)"
27. Mehdi Mokkaram, "One-Dimensional convection-diffusion problems and some numerical methods (2005)"
28. Mina Bagherpoorfard, "Using Multi Level preconditioners on unstructured grids and its application in elliptic boundary value (2005)"
29. Vajihe Ghanbari, "A B-Spline collection method for solving convection-diffusion equation (2006)"

30. Mahdyar Barfeie, "Some applications of second order quasi-linear partial differential-algebraic equations and its numerical solution with finite difference methods (2006)"
31. Bella Ghazati, "Performance of DAE and ILU preconditioner in simulating anisotropic diffusion in human brain (2006)"
32. Maryam Khairmand, "Maxwell's Equation and Split-Step method analysis (2007)"
33. Mahboobeh Samsami, "Defect Control for RK-methods using Computed interpolation (2007)"
34. Ali Abdi, "The resolution of the Gibbs phenomenon for Fourier approximation (2007)"
35. Fakhradin Mohammadi, "A solution of stochastic linear algebraic equation (2008)"
36. Payam Mokhtary Aghdami, "General linear method Inherent Runge-Kutta stability for stiff ODEs (2008)"
37. Mojtaba Hajipour, "Investigating a preconditioner for the Tou method (2008)"
38. Ali Kahzadvand Baharvand, "Efficient interpolation of large stiff systems of ODEs with Exponential Propagation Iterative (EPI) methods (2008)"
39. Yalda Shamsi, "Euler adaptive method for stochastic differential equations (2008)"
40. Sadegh Amiri, "Numerical Solution of Tou and Three Dimensional parabolic Equation by the use of ADI method and its Application in the Heat Transfer Flow and Convection Diffusion Flow problems (2009)"
41. Yaser Behrouzi, "An additive semi-implicit Runge-Kutta methods for stiff and nonstiff system (2009)"

42. Robabeh Mohammadzadeh, "Solving Differential Equations by Feedforward Neural Networks (2009)"
43. Mahmood Bardel, "Mean square stability of Ronge-Kutta methods for stochastic differential equations (2009)"
44. Rafat Alami, "Solving the multi-dimensional Black-Scholes partial differential equation for the pricing of financial contracts by (RBF) (2009)"
45. Mansoureh Mojahedfar, "Solving the Black-Scholes equation using high-order compact finite differences (2009)"
46. Leila Taghizadeh, "Higher order BDF methods and investigation of their stability (2009)"
- 47.