FATEMEH SOLEYMAN

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EDUCATION

PhD in Applied Mathematics, K.N.Toosi University of Technology, Tehran, Iran **2013 – 2017**
Specialized in: PDE, Special functions, Orthogonal polynomials

MSc in Applied Mathematics, K.N.Toosi University of Technology, Tehran, Iran **2010 – 2012**
Specialized in: Numerical analysis

BSc in Applied Mathematics, Urmia Payam Nur University, Urmia, Iran **2005 – 2009**

RESEARCH EXPERIENCE

Institute for Advanced Studies in Basic Sciences **2020 – 2022**
Postdoctoral fellow

- **Discovering the quantum Sturm-Liouville problems solutions**
  - Considered two new Quantum Sturm-Liouville problems and proved their finite orthogonality with respect to two weight functions which correspond to Fisher and T-student distributions in continuous cases
  - Proved the finite orthogonality of q-Pseudo Jacobi polynomials using the Sturm–Liouville theory in q-difference spaces
- **Analysis of new generalization of the q-Sturm-Liouville problem**
  - Presented a general theorem for *(p,q)*-Sturm-Liouville problems and their orthogonal solutions

K.N.Toosi University of Technology, Tehran, Iran **2017 – 2020**
Visiting Scholar

- **Study of q-Pseudo Jacobi polynomials**
  - Proved the finite orthogonality of q-Pseudo Jacobi polynomials
  - Computed the norm square values using the Favard theorem

Universidade de Santiago de Compostela, Spain **2016 – 2017**
Visiting Graduate Researcher (PhD)

- **Development of Novel Quantum and post quantum classical orthogonal polynomials and their relation with Jacobi polynomials**
  - Developed a representation of post quantum Bernstein polynomials in terms of post quantum Jacobi polynomials
  - Obtained important characteristics for the coefficients in the expansion of (p, q)-Bernstein polynomials
  - Studied a special case of q-orthogonal polynomials, called 0-Jacobi Bessel polynomials which reduce to Jacobi polynomials in special condition

K.N.Toosi University of Technology, Tehran, Iran **2013 – 2017**
Graduate Student Researcher (PhD)

- **Study of Post quantum classical orthogonal polynomials and their hypergeometric representations**
  - obtained useful characteristics of the (p,q)-classical orthogonal polynomials and their various representations
  - developed (p,q)-analogues of shifted Jacobi, Laguerre, and Hermite and Appel polynomials and covered all characteristics in continuous cases

- **Study of the basic hypergeometric series and orthogonal polynomials with hypergeometric representation**

- Developed the decomposition formula for bivariate hypergeometric-trigonometric series

K.N.Toosi University of Technology, Tehran, Iran **2010 – 2012**

Graduate Student Researcher (Masters)

- **Error bounds in numerical quadrature rules**

- Study of numerical quadrature and comparing their error bounds to find a better method with the fewest possible function evaluations

TEACHING EXPERIENCE

Lecturer

K.N.Toosi University of Technology, Tehran, Iran **2017 – 2022**

- Differential equation
- Numerical Analysis
- Calculus I, II and III to the Mathematics & Applied Physics majors.

Graduate Teaching Assistant:

K.N.Toosi University of Technology, Tehran, Iran **2013 – 2017**

- Differential equation
- Special function
- Introduction to Numerical Analysis

HONORS AND AWARDS

- Ranked 10 among 3,000 qualified participants in the Iran's national universities doctorate entrance exam, 2013
- Member of the executive committee at the International Workshop on Integral Equations & Matrix Theory, Tehran, Iran, 2017

SKILLS

Software Skills:

- General MS Office software skills such as Word, Excel, PowerPoint
- Extensive experience with the Latex software

Programming Skills

- Excellent experience of programming with Mathematica, Maple and Matlab

Soft Skills

Fluent in English, Persian, Turkish and Azeri languages.

Strong Verbal and Written Communication Skills Ability to work independently, as a team member and/or in leadership positions with people of diverse technical and cultural backgrounds.

Quick learner and Self-motivate with Critical thinking and problem-solving skills.

PRESENTATIONS AT CONFERENCES AND SEMINARS

- Seminar of Differential Equations and Functional Analysis, Universidade de Santiago de Compostela, Santiago de Compostela, Spain, with one-hour lecture entitled "On q-calculus and q-Sturm-Liouville problems", 2016.
- Seminar of Department of Applied Mathematics II, Universidade de Vigo, Vigo, Spain, with talk entitled "Some classes of finite q-orthogonal polynomials",2016.

- International Workshop on Mathematical Methods in Engineering (MME 2017), Cankaya University, Ankara, Turkey, with oral presentation of the paper entitled, On *(p,q)*-classical orthogonal polynomials and their characterization theorems",2017.
- International Conference on Mathematics and Mathematics Education (ICMME-2017), Harran University, Sanliurfa, Turkey, with oral presentation of the paper entitled "A decomposition formula for bivariate hypergeometric-trigonometric series",2017.
- The 4th Seminar on Functional Analysis and its Applications, Ferdowsi University of Mashhad, Iran, with one lecture on "*q*-Pearson difference equation",2016.
- The 6th Seminar on Numerical Analysis and Its Applications, University of Maragheh, Iran, with one lecture on "On some definite *q*-integrals",2016.
- International Conference on Mathematical Modelling in Applied Science, Saint Petersburg-Russia, "Some properties of (p,q)-orthogonal polynomials", 2017.
- 2nd International Conference on Mathematical Modelling in Applied Sciences, Belgorod-Russia, "On the finite orthogonality of q-classical polynomials", 2019.

PUBLICATIONS

- Mohammad Masjed-Jamei, Nasser Saad, Wolfram Koepf, **Fatemeh Soleyman**, On the finite orthogonality of q-Pseudo-Jacobi polynomials, Mathematics, 2020, volume 8, Article 1323.
- M. Masjed-Jamei, **F. Soleyman**, W. Koepf, Two finite sequences of symmetric q-orthogonal polynomials generated by two q-Sturm-Liouville problems, Reports on Mathematical Physics, 2020, volume 85, pp 41-55.
- **F. Soleyman**, P. N. Sadjang, M. Masjed-Jamei, I. Area*, (p,q)*-Sturm-Liouville problems and their orthogonal solutions, Mathematical Methods in the Applied Sciences, 2018, volume 41, pages 8997-9009.
- **F. Soleyman**, M. Masjed-Majei, and I. Area A finite class of *q*-orthogonal polynomials corresponding to inverse gamma distribution, Analysis and Mathematical Physics, 2017, volume 7, pp. 479-492.
- M. Masjed-Jamei, **F. Soleyman**, I. Area and J. J. Nieto, Two finite *q*-Sturm-Liouville problems and their orthogonal polynomial solutions, Filomat, 2018, volume 32, pp. 231–244.
- M. Masjed-Jamei, **F. Soleyman**, I. Area and J. J. Nieto, On *(p,q)*-classical orthogonal polynomials and their characterization theorems, Advances in Difference Equations, 2017, volume 2017, Article 186.
- **F. Soleyman**, I. Area, M. Masjed-Jamei, JJ Nieto, Representation of *(p,q*)-Bernstein polynomials in terms of *(p,q)*-Jacobi polynomials, Journal of inequalities and applications, 2017, volume 2017, Article 167.
- M. Masjed-Jamei and **F. Soleyman**, A decomposition formula for bivariate hypergeometric-trigonometric series, Turkish Journal of Mathematics & Computer Science, 2018, volume 8, pages 10-15.

BOOKS AND TRANSLATIONS

Translation of "An introduction to orthogonal polynomials" T. S. Chihara (in Persian)**.**