



Fatemeh P. A. Beik

Curriculum Vitae

"Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country. - David Hilbert

Personal Information

Full name: Fatemeh Panjeh Ali Beik (Beik, F. P. A.)
Academic rank: Associate professor.
Affiliation: Vali-e-Asr University of Rafsanjan (Department of Mathematics).
Place of birth: Tehran, Iran.
Year of birth: 1981.
Citizenship: Iranian.

Teaching Materials

- Topics on Numerical Linear Algebra (Ph. D. course)
- Topics on Iterative Methods for Solving Linear Systems (Ph. D. course)
- Control & System theory (Ph. D. course)
- Advanced Numerical Analysis (M. Sc. course)
- Approximation Theory (M. Sc. course)
- Numerical Methods in Linear Algebra (M. Sc. course)
- Calculus (B. Sc. course)
- Numerical Analysis (B. Sc. course)
- Numerical Linear Algebra (B. Sc. course)

Research Interests

Studying the performance of (preconditioned) iterative methods to solve linear and multi-linear (tensor) operator equations.

Educations

2007–2010 **Ph.D. of Applied Mathematics**, *Shahid Bahonar University of Kerman*, Kerman, Iran.

2005–2007 **Master of Applied Mathematics**, *Shahid Bahonar University of Kerman*, Kerman, Iran.

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2000–2005 **Bachelor of Applied Mathematics**, *Vali-e-Asr University of Rafsanjan*, Rafsanjan, Iran.

Ph.D. Thesis

Title *Iterative methods for solving large and sparse linear system of equations*
Supervisor Professor Mahmoud Mohseni Moghadam
Advisor Professor Abbas Salemi Parizi

Honors

- 2007 Ranked first among all master students of Applied Mathematics, Shahid Bahonar University of Kerman.
- 2013 Outstanding young researcher of Vali-e-Asr University of Rafsanjan.
- 2015 Outstanding researcher of the department of Mathematics, Vali-e-Asr University of Rafsanjan
- 2016 Outstanding researcher of the faculty of Mathematical and Computer Sciences, Vali-e-Asr University of Rafsanjan
- 2018 Winner of Prof. Riazi Kermani Award in 2018; The awarded is for the best paper presented in the annual Iranian math conference

Memberships

- 2011–present **Member of Iranian Math. Soc.**
- 2013–present **Member of American Math. Soc.**
- 2011 **Member of scientific committee of 42nd Annual Iranian Conference**, *Vali-e-Asr University of Rafsanjan*, Rafsanjan, Iran.
- 2014 **Member of scientific committee; 5th Conference of Numerical Analysis and its Applications**, *Vali-e-Asr University of Rafsanjan*, Rafsanjan, Iran.
- 2018 **Member of scientific committee; 7th Conference of Numerical Analysis and its Applications**, *Shahid Bahonar University of Kerman*, Kerman, Iran.

Editorial Boards

- 2017–present **Wavelet and Linear Algebra (WALA).**
- 2019–present **Bulletin of the Iranian Mathematical Society (BIMS).**

Administrative Background

1. **Deputy Dean at Faculty of Mathematical Sciences**, *Vali-e-Asr University of Rafsanjan*, Oct 2017–Nov 2019.
2. **Director of Postgraduate Educations**, *Vali-e-Asr University of Rafsanjan*, Nov 2019–present.

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Sabbatical Leave

2016–2017 **Department of Mathematics and Computer Science**, *Scientific Computing Group*, Emory University, Atlanta, GA 30322, USA.

Host: Prof. Michele Benzi

Selected Papers

- F. P. A. Beik, K. Jbilou, M. Najafi-Kalyani and L. Reichel, On the Golub-Kahan bidiagonalization for ill-posed tensor equations with applications to color image restoration, *Numerical Algorithms*, to appear. (JCR)
- F. P. A. Beik, M. Najafi-Kalyani and L. Reichel, Iterative Tikhonov regularization of tensor equations based on the Arnoldi process and some of its generalizations, *Applied Numerical Mathematics*, 151 (2020), 425–447. (JCR)
- M. Benzi and F. P. A. Beik, Uzawa-type and augmented Lagrangian methods for double saddle point systems, *Structured Matrices in Numerical Linear Algebra*, Springer, Cham, (2019) 215–236.
- M. Najafi-Kalyani, F. P. A. Beik and K. Jbilou, On global iterative schemes based on Hessenberg process for (ill-posed) Sylvester tensor equations, *Journal of Computational and Applied Mathematics*, Available online, DOI: 10.1016/j.cam.2019.03.045. (JCR)
- M. Benzi, F. P. A. Beik, S.-H. A. Chaparpordi and Z. Roygar, Generalized iterative methods for solving double saddle point problem, *Mathematical Researches*. 2020; 6 (1) (In Persian).
- S.-H. A. Chaparpordi, F. P. A. Beik and D. K. Salkuyeh, Block triangular preconditioners for stabilized saddle point problems with nonsymmetric $(1, 1)$ -block, *Computers & Mathematics with Applications*. 76 (2018), no. 6, 1544-1553. (JCR)
- F. P. A. Beik and M. Benzi, Block preconditioners for saddle point systems arising from liquid crystal directors modeling, *CALCOLO*, 55 (2018) 29 DOI: 1–1810.1007/s10092-018-0271-6. (JCR)
- F. P. A. Beik and M. Benzi, Iterative methods for double saddle point systems, *SIAM Journal on Matrix Analysis and Applications*. 39 (2018), no. 2, 902–921. (JCR)
- A. Ameri and F. P. A. Beik, Delayed over-relaxation in iterative schemes to solve rank deficient linear systems of (matrix) equations, *FILOMAT*, 32 (2018), no. 9, 3181–3198. (JCR)
- F. P. A. Beik, S. Ahmadi-Asl and A. Ameri, On the iterative refinement of the solution of ill-conditioned linear system of equations, *International Journal of Computer Mathematics*, 95 (2018),no. 2, 427–443. (JCR)
- F. P. A. Beik, M. Benzi and S.-H. A. Chaparpordi, On block diagonal and block triangular iterative schemes and preconditioners for stabilized saddle point problems, *Journal of Computational and Applied Mathematics*, 326 (2017) 15–30. (JCR)
- F. P. A. Beik and D. K. Salkuyeh, A cyclic iterative approach and its modified version to solve coupled Sylvester–transpose matrix equations, *Linear and Multilinear Algebra*, 65 (2017), no. 12, 2406–2423. (JCR)
- S. Ahmadi-Asl and F. P. A. Beik, An efficient iterative algorithm for quaternionic least-squares problems over the generalized η -(anti-)bi-Hermitian matrices, *Linear and Multilinear Algebra*, 65 (2017), no. 9, 1743–1769. (JCR)
- D. K. Salkuyeh, F. P. A. Beik, D. Hezari, A sequential two-stage method for solving generalized saddlepoint problems, *UPB Scientific Bulletin, Series A: Applied Mathematics and Physics*, 79 (2017), no. 1, 131–140. (JCR)
- S. Ahmadi-Asl and F. P. A. Beik, Iterative algorithms for least-squares solutions of a quaternion matrix equation, *Journal of Applied Mathematics and Computing*, 53 (2017), no. 1, 95–127.

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- F. P. A. Beik and D.K. Salkuyeh, An iterative algorithm for the best approximate (P, Q) -orthogonal symmetric and skew-symmetric solution pair of coupled matrix equations, *Transactions of the Institute of Measurement and Control*, 39 (2017), no. 4, 537–554. (JCR)
- D. K. Salkuyeh, M. Hasani and F. P. A. Beik, On the preconditioned AOR iterative method for Z-matrices, *Computational & Applied Mathematics*, 36 (2017), 877–883. (JCR)
- F. P. A. Beik, On a general class of preconditioners for nonsymmetric generalized saddle point problems, *UPB Scientific Bulletin, Series A: Applied Mathematics and Physics*, 78 (2016), no. 4, 211–220. (JCR)
- F. P. A. Beik, F. S. Movahed and S. Ahmadi-Asl, On the Krylov subspace methods based on tensor format for positive definite Sylvester tensor equations, *Numerical Linear Algebra with Applications*, 23 (2016), no. 3, 444–466. (JCR)
- F. P. A. Beik and S. Ahmadi-Asl, An iterative algorithm for η -(anti)-Hermitian least-squares solutions of quaternion matrix equations, *Electronic Journal of Linear Algebra (ELA)*, 30 (2015) 372–401. (JCR)
- F. P. A. Beik and D.K. Salkuyeh, An iterative algorithm for the least squares solutions of matrix equations over symmetric arrowhead matrices, *Journal of the Korean Mathematical Society*, 52 (2015) 349–372. (JCR)
- F. P. A. Beik and D.K. Salkuyeh, Weighted versions of GI-FOM and GI-GMRES for solving general coupled linear matrix equations, *Computational Mathematics and Mathematical Physics*, 55 (2015), no. 10, 1606–1618. (JCR)
- F. P. A. Beik and N. N. Shams, On the modified iterative methods for M-matrix linear system, *Bulletin of the Iranian Mathematical Society (BIMS)*, 41 (2015), no. 6, 1519–1535. (JCR)
- D. K. Salkuyeh and F. P. A. Beik, Minimum norm least-squares solution to general complex coupled linear matrix equations via iteration, *FILOMAT*, 29 (2015) 1389–1407.(JCR)
- F. P. A. Beik and S. Ahmadi-Asl, Residual norm steepest descent based iterative algorithms for Sylvester tensor equations, *Journal of Mathematical Modeling*, 2 (2015) 115–131. (JCR)
- F. P. A. Beik and D.K. Salkuyeh, A finite iterative algorithm for Hermitian reflexive and skew-Hermitian solution groups of the general coupled linear matrix equations, *Journal of Applied Mathematics and Computing*, 48 (2015) 129-155.
- F. P. A. Beik, A modified iterative algorithm for the (Hermitian) reflexive solution of the generalized Sylvester matrix equation, *Transactions of the Institute of Measurement and Control*, 36 (2014), no. 6, 815–827. (JCR)
- F. P. A. Beik and M. M. Moghadam, The general coupled linear matrix equations with conjugate and transpose unknowns over the mixed groups of generalized reflexive and anti-reflexive matrices, *Computational & Applied Mathematics*, 33 (2014) 795–820. (JCR)
- D. K. Salkuyeh and F. P. A. Beik, On the gradient based algorithm for solving the general coupled matrix equations, *Transactions of the Institute of Measurement and Control*, 36 (2014), no. 3, 375–381. (JCR)
- F. P. A. Beik, Theoretical results on the global GMRES method for solving generalized Sylvester matrix equations, *Bulletin of the Iranian Mathematical Society (BIMS)*, 40 (2014), no. 5, 1097–1117.(JCR)
- F. P. A. Beik and N. N. Shams, Preconditioned generalized mixed-type splitting iterative method for solving weighted least squares problems, *International Journal of Computer Mathematics*, 91 (2014), no. 5, 944–963. (JCR)
- F. P. A. Beik, D.K. Salkuyeh and M. M. Moghadam, Gradient based iterative algorithm for solving the generalized coupled Sylvester-transpose and conjugate matrix equations over reflexive

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- (anti-reflexive) matrices, Transactions of the Institute of Measurement and Control, 36 (2014), no. 1, 99-110. (JCR)
- D.K. Salkuyeh and F. P. A. Beik, An iterative method to solve symmetric positive definite matrix equations, Mathematical Reports, 16 (2014), no. 2, 271–283. (JCR)
 - F. P. A. Beik and D.K. Salkuyeh, The coupled Sylvester-transpose matrix equations over generalized centro-symmetric matrices, International Journal of Computer Mathematics, 90 (2013), no. 7, 1546-1566. (JCR)
 - M. M. Moghadam and F. P. A. Beik, Comparison results on the preconditioned mixed-type splitting iterative method for M-matrix linear systems, Bulletin of the Iranian Mathematical Society (BIMS), 38 (2012), no. 2, 349-367. (JCR)
 - F. P. A. Beik and D.K. Salkuyeh, On the global Krylov subspace methods for solving general coupled matrix equations, Computers & Mathematics with Applications, 62 (2011), no. 11, 4605-4613. (JCR)

Conference Papers

- M. M. Moghadam and F. P. A. Beik, Improving block Gauss-Seidel iterative method for solving Z-matrix linear systems, The 39th Annual Iranian Mathematics conference, Shahid Bahonar University of Kerman, Kerman (2007)
- M. M. Moghadam and F. P. A. Beik, Modified block AOR iterative method for Z-matrices linear systems, The 40th Annual Iranian Mathematics conference, Sharif University of technology, Tehran (2008).
- F. P. A. Beik and M. M. Moghadam, Note to the preconditioned generalized mixed-type splitting iterative method,, The 42th Annual Iranian Mathematics conference, Vali-e-Asr University of Rafsanjan, Rafsanjan (2011).
- F. P. A. Beik and M. M. Moghadam, Projection methods for solving Sylvester matrix equation, The 42th Annual Iranian Mathematics conference, Vali-e-Asr University of Rafsanjan, Rafsanjan (2011).
- F. P. A. Beik and D.K. Salkuyeh, An iterative algorithm for the generalized (P,Q)-reflexive solution of the coupled Sylvester-transpose matrix equations, The 43rd Annual Iranian Mathematical conference, Tabriz University, Tabriz (2012).
- F. P. A. Beik and D.K. Salkuyeh, On the convergence of the GI-GMRES method for solving the general coupled linear matrix equations, The 43rd Annual Iranian Mathematical conference, Tabriz University, Tabriz (2012).
- F. P. A. Beik, Iterative algorithms for solving coupled Sylvester-transpse matrix equations, The 5th Mathematics conference of Payame Noor University, Shiraz (2012).
- F. P. A. Beik and D. K. Salkuyeh, A projection technique for reflexive (anti-reflexive) solution of the coupled linear matrix equations, The 4th Conference on Mathematical Analysis and its Applications, Khansar (2013).
- D. K. Salkuyeh and F. P. A. Beik, On the convergenc of the gradient-based iterative method, The 44th Annual Iranian Mathematics Conference, Ferdowsi University of Mashhad, (2013).
- F. P. A. Beik, N. N. Shams and S. Ahmadi-Asl, A preconditioned GAOR iterative method for solving linear system of equations, The 7th Seminar on Linear Algebra and its Applications, Mashhad (2014).
- F. P. A. Beik and S. Ahmadi-Asl, Note to the gradient-based iterative algorithm for solving Sylvester tensor equations, The 7th Seminar on Linear Algebra and its Applications, Mashhad (2014).

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- F. P. A. Beik and S. Ahmadi-Asl, On the execution and convergence of GMRES-BTF method for solving Sylvester tensor equations, The 45h Annual Iranian Mathematics Conference, Semnan University, (2014).
- D. K. Salkuyeh, M. Hasani and F. P. A. Beik, The best preconditioned AOR method for a class of matrices, The 45th Annual Iranian Mathematics Conference, Semnan University, (2014).
- F. P. A. Beik and F. S. Movahed, FOM-BTF: Full Orthogonalization method based on tensor format, 5th Conference on Mathematical Analysis and its Applications, Vali-e-Asr University, Rafsanjan, (2014).
- F. P. A. Beik, S. Ahmadi-Asl and D. K. Salkuyeh, CGLS for general coupled linear matrix equations over Quaternions, 5th Conference on Mathematical Analysis and its Applications, Vali-e-Asr University, Rafsanjan, (2014).
- S. Ahmadi-Asl and F. P. A. Beik, An iterative algorithm for Hermitian tridiagonal least-squares solutions of quaternion matrix equations, The 8th Seminar on Linear Algebra and its Applications, University of Kurdistan, (2015).
- F. P. A. Beik and M. Benzi, On the block triangular preconditioners for stabilized saddle point problems, The 47th Annual Iranian Mathematics Conference, Kharazmi University, (2016).
- F. P. A. Beik, A. Ameri and S. Ahmadi-Asl, Iterative refinement of the solution of ill-conditioned linear system, The 47th Annual Iranian Mathematics Conference, Kharazmi University, (2016).
- F. P. A. Beik and Mehdi Najafi, A generalized global Arnoldi method based on tensor format for ill-posed tensor equations, the third conference on Numerical Analysis and Scientific Computation with Applications (NASCA2018), Kalamata, Greece, July 2nd–July 6th (2018).
- Mehdi Najafi and F. P. A. Beik, A generalized global Golub-Kahan method for ill-posed matrix equations, The 7th Conference on Mathematical Analysis and its Applications, Shahid Bahonar University of Kerman, Kerman, Iran July 11–12 (2018).
- A. Ameri and F. P. A. Beik, Iterative schemes with delayed over-relaxation step to solve complex matrix equations, The 7th Conference on Mathematical Analysis and its Applications, Shahid Bahonar University of Kerman, Kerman, Iran July 11–12 (2018).

Supervised Ph.D. Students

- 2013–2016 **Salman Ahmadi-Asl**, *New developments on iterative methods to solve some classes of linear operator equations over quaternion ring*, Advisor: M. M. Moghadam, Defense date: December 16, 2016.
- 2014–2018 **Sayed-Hasan Azizi Chaparpordi**, *Topics on iterative methods and preconditioned techniques for solving some linear problems*, Advisor: D. K. Salkuyeh, Defense date: September 17, 2018.
- 2014–2019 **Arezo Ameri**, *New developments on iterative methods for solving some linear and murilinear system of equations*, Advisor: H. Sadeghi-Goughery, Defense date: January 24, 2019.
- 2017–present **Mehdi Najafi-Kalyani**, *Topics on numerical techniques related to large matrices with Kronecker structure*, Advisor: K. Jbilou.
- 2018–present **Somayeh Mollahsani**.
- 2019–present **Melika Abousaeidi**.

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Supervised long-term visitors

2014 **Farid Saberi Movahed**, *February–September*.

Supervised M.Sc. Students

- 2011–2013 **Nafiseh Naseri Shams**, *Mixed-Type splitting iterative method for solving linear system of equations*, Defense date: August 19, 2013, Advisor: Prof. M. M. Moghadam.
- 2012–2014 **Raziyeh Mirzahashemi**, *Numerical solutions of matrix differential equations using cubic-matrix splines*, Defense date: September 18, 2014, Advisor: Dr. Z. Rahbani.
- 2012–2014 **Batool Rahmani**, *Preconditioned generalized accelerated overrelaxation iterative methods for solving linear system of equations*, Defense date: September 18, 2014.
- 2012–2014 **Arezo Keshvari-Pour**, *Hermitian and skew-Hermitian splitting (HSS) iterative method for solving linear matrix equations*, Defense date: October 18, 2014.
- 2013–2015 **Shima Adelinia**, *Iterative methods for solving complex symmetric linear systems*, Defense date: August 29, 2015.
- 2013–2015 **Elham Moradi**, *Matrix iterative methods for constraint solutions of the matrix equations*, Defense date: August 29, 2015.
- 2013–2015 **Mobarakeh Gharavi**, *Numerical solution of matrix equations via conjugate gradient method*, Defense date: September 22, 2015.
- 2014–2016 **Fatemeh Zebardast**, *A class of iterative methods for solving saddle point problem*, Defense date: July 4, 2016.
- 2015–2017 **Zohreh Roygari**, *Successive over relaxation (SOR) iterative method and its symmetric version to solve saddle point problem*, Defense date: September 11, 2017.
- 2015–2018 **Athareh Ghaderi**, *Successive over relaxation (SSOR) iterative method for solving some nonsymmetric linear systems of equations*, Defense date: September 18, 2018.
- 2017–present **Marjan Pourasadolahi**, *Studying the performance of preconditioners extracted from some stationary iterative method for saddle point problems*.
- 2017–present **Sepideh Farokhi**, *A class of stationary iterative methods and its corresponding preconditioner to solve Sylvester matrix equations*.
- 2018–present **Haniyeh Emadeslami**, .
- 2018–present **Alireza Mangeli**, .

Additional Activities

- Reviewer in Mathematical Reviews (MathSciNet)
- Reviewer in Zentralblatt MATH (zbMath)
- Referee for the following journals
 - Bulletin of the Iranian Mathematical Society
 - Mathematical Problem in Engineering
 - Transactions of the Institute of Measurement and Control
 - Iranian Journal of Numerical Analysis and Optimization
 - Computers & Mathematics with Applications
 - IET Control Theory & Applications

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- Journal of Applied Mathematics and Computing
- Asian Journal of Control
- Iranian Journal of Science and Technology (Sciences)
- Mathematical Modelling and Analysis
- CALCOLO; Wavelet and Linear Algebra; FILOMAT
- Numerical Algorithms
- Journal of Inequalities and Applications
- Applied Mathematics and Computation
- BIT Numerical Mathematics
- International Journal of Computer Mathematics
- IMA Journal of Numerical Analysis
- SIAM Journal on Matrix Analysis and Applications
- Linear and Multilinear Algebra; Advances in Mechanical Engineering; Optimization
- International Journal of Systems Science
- Applied Mathematics Letters
- Applied Numrical Mathematics

Languages

Persian **Mothertongue**

English **Advance**

Fluent

References

- 1 **Michele Benzi**, *Classe di Scienze*, Scuola Normale Superiore, Piazza dei Cavalieri, 7, 56126 Pisa, Italy.
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- 2 **Mohammad Ali Dehghan**, *Department of Mathematics*, Vali-e-Asr University of Rafsanjan, email: dehghan@vru.ac.ir.
- 3 **Mahmoud Mohseni Moghadam**, *Department of Mathematics*, Shahid Bahonar Uiversity of Kerman, email: mohseni@uk.ac.ir.
- 4 **Davod Khojasteh Salkuyeh**, *Department of Mathematics*, University of Guilan, email: salkuyeh@gmail.com; khojasteh@guilan.ac.ir.

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