S. Mojtaba Varedi-Koulaei

PhD of Mechanical Engineering (Applied Design)

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Education:

PhD Mechanical Engineering (2015)
- **University**: Babol Noshirvani University of Technology
- **Supervisor**: Dr. H. Mohammadi Daniali (Professor)
- **Thesis**: "Optimal design of the parallel mechanisms considering joints clearances"
- **GPA**: 18.99 / 20.00 (Equivalent to 3.79 / 4.00)

M.Sc. Mechanical Engineering (2008)
- **University**: University of Mazandaran
- **Supervisor**: Dr. H. Mohammadi Daniali (Professor)
- **Thesis**: "Analytical-numerical solution of the forward and inverse kinematic equations of the robots"
- **GPA**: 18.03 / 20.00 (Equivalent to 3.61 / 4.00)

B.S. Mechanical Engineering (2006)

- **University**: University of Mazandaran
- **Supervisor**: Dr. H. Mohammadi Daniali (Professor)
- **Final project**: "Designing the transfer of objects in a production line"
- **GPA**: 17.00 / 20.00 (Equivalent to 3.4 / 4.00)

Research Interests:

- ❖ Mechanism Design and Synthesis
- ❖ Optimization using metaheuristic algorithms
- ❖ Neural Network
- ❖ Multibody System Dynamics
- ❖ Parallel Robots

Taught Courses:

- ❖ Dynamics
- ❖ Dynamics of machinery
- ❖ Mechanism Design
- ❖ Automatic Control
- ❖ Robotics
- ❖ Advanced Mathematics
- ❖ Advanced robotics
- ❖ Mechatronics
- ❖ Neural network
- ❖ Optimization
- ❖ Advanced dynamics

Journal Papers:

1. **Varedi-Koulaei, Seyyed Mojtaba**, Masoud Mohammadi, Mohammad Amin Malek Mohammadi, and Mahdi Bamdad. "Optimal Synthesis of the Stephenson-II Linkage for Finger Exoskeleton Using Swarm-based Optimization Algorithms." *Journal of Bionic Engineering* (2023): 1-16.

2. **Varedi-Koulaei, Seyyed Mojtaba**. "Function Generation Synthesis of the Four-bar Linkage Based on Four and Five Precision Points Using Newton-HCM." *ADMT Journal* (2023).

3. Ghazvini, Mahyar, **Seyyed Mojtaba Varedi-Koulaei**, Mohammad Hossein Ahmadi, and Myeongsub Kim. "Optimization of MLP neural network for modeling flow boiling performance of Al2O3/water nanofluids in a horizontal tube." *Engineering Analysis with Boundary Elements* 145 (2022): 363-395.

4. Moradi, Sadegh, Mahdi Gerdooei, **Seyyed Mojtaba Varedi-Koulaei**, and Hasan Ghaforian Nosrati. "MLP neural network with an optimal architecture for modeling the ECAP-C process." *Neural Computing and Applications* (2022): 1-15.

5. Mokhtari Karchegani, Mehdi, and **Seyyed Mojtaba Varedi-Koulaei**. "Optimal Synthesis of the Planar Compliant Mechanism Using ICA Algorithm." *Journal of Mechanical Engineering* 52, no. 1 (2022): 345-349.

6. Nazari, Mostafa, **S. Mojtaba Varedi-Koulaei**, and Mohsen Nazari. "Flow characteristics prediction in a flow-focusing microchannel for a desired droplet size using an inverse model: experimental and numerical study." *Microfluidics and Nanofluidics* 26, no. 4 (2022): 1-19.

7. Mokhtari, Mehdi, **Seyyed Mojtaba Varedi-Koulaei**, Jiaxiang Zhu, and Guangbo Hao. "Topology optimization of the compliant mechanisms considering curved beam elements using metaheuristic algorithms." *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* (2022): 09544062221075277.

8. Foroutan, Kamran, **Seyyed Mojtaba Varedi-Koulaei**, Nguyen Dinh Duc, and Habib Ahmadi. "Non-linear static and dynamic buckling analysis of laminated composite cylindrical shell embedded in non-linear elastic foundation using the swarm-based metaheuristic algorithms." *European Journal of Mechanics-A/Solids* 91 (2022): 104420.

9. Rahmati, A., **S. M. Varedi-Koulaei**, M. H. Ahmadi, and H. Ahmadi. "Dynamic synthesis of the alpha-type stirling engine based on reducing the output velocity fluctuations using Metaheuristic algorithms." *Energy* 238 (2022): 121686.

10. AbdolMohammadi, Masoud, Habib Ahmadi, **Seyyed Mojtaba Varedi-Koulaei**, and Javad Ghalibafan. "Active Vibration Control of a Nonlinear System with Optimizing The Controller Coefficients Using Metaheuristic Algorithms." *AUT Journal of Mechanical Engineering* 5, no. 4 (2021): 2-2.

11. Sardashti, A., H. M. Daniali, and **S. M. Varedi-Koulaei**. "Geometrical Similarity Error Function-Innovative Adaptive Algorithm methodology in path generation synthesis of the four-bar mechanism using metaheuristic algorithms." *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* (2021): 09544062211015787.

12. **Varedi-Koulaei, S. M.,** and M. R. MohammadZadeh. "Modified IWO algorithm for topological optimum synthesis of the displacement amplifying compliant mechanism." *Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering* (2021): 09544089211011022.

13. **Seyyed Mojtaba Varedi-Koulaei**, Mahdi Bamdad and Borzo Fathi, The Effects of Revolute Joint Clearance on the Kinematic Behavior of the 3RPR Planar Parallel Manipulator, *Journal of Applied and Computational Sciences in Mechanics*, Vol. 31, No. 1, 2020 (In Persian).

14. Rahmati, A., **S. M. Varedi-Koulaei**, M. H. Ahmadi, and H. Ahmadi. "Dimensional synthesis of the Stirling engine based on optimizing the output work by evolutionary algorithms." *Energy Reports* 6 (2020): 1468-1486.

15. **Varedi-Koulaei, S. M.,** and H. Rezagholizadeh. "Synthesis of the four-bar linkage as path generation by choosing the shape of the connecting rod." *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science* (2020): 0954406220908616.

16. **Varedi-Koulaei, S. M.,** and F. Ghanbari. "Design of the Bistable Compliant Four-bar Linkage with Changing the Position of the Flexible Limb." *Modares Mechanical Engineering* 19, no. 8 (2019): 2047-2055 (In Persian).

17. **Varedi-Koulaei, Seyyed Mojtaba**, and Masoumeh Rahimi. "Direct Kinematics Solution of 3-RCC Parallel Robot using a Semi-Analytical Homotopy Method." *ADMT Journal* 12, no. 1 (2019): 1-12.

18. Morteza Nazari, Jafar Fathali, Mostafa Nazari, **Seyed Mojtaba Varedi**, Inverse of Backup 2-Median Problems with Variable Edge Lengths and Vertex Weight on Trees and Variable Coordinates on THE Plane, *Production and Operations Management*, Vol. 9, Issue 2, No. 17,Autumn & Winter 2019 (In Persian).

19. **S. M. Varedi-Koulaei**, M. Abdolmohammadi, H. Ahmadi, M. Nazari, Optimization of the Turbines Locating in the Wind Farm, *Amirkabir J. Mech. Eng.***,** 50(4) (2018) 1-4.

20. **S. M. Varedi-Koulaei**, M. Bamdad, The Effects of Joint Clearance on the Dynamics of the 3-RPR Planar Parallel Manipulator, *Journal of Advanced Design And Manufacturing Technology (ADMT)* Volume 11, Issue 2, Spring 2018, Page 113-120.

21. M. Shafiee-Ashtiani, A. Yousefi-Koma, H. Keshavarz, **S. M. Varedi-Koulaei**, Real Time Direct Kinematics Solution of 3-RPS Parallel Robot Using a Semi-Analytical Homotopy Method, *Modares Mechanical Engineering*, Vol. 17, No. 6, pp. 303-310, 2017 (in Persian).

22. **S. M. Varedi-Koulaei**, H. M. Daniali, M. Farajtabar, B. Fathi, M. Shafiee-Ashtiani, Reducing the undesirable effects of joints clearance on the behavior of the planar 3-RRR parallel manipulators, *Nonlinear Dynamics* (2016) 86:1007–1022.

23. Mohammad Farajtabar, Hamid M. Daniali, **Seyyed M. Varedi**, "Error Compensation for Continuous Path Operation of 3-RRR Planar Parallel Manipulator with Clearance in the Joints", *Journal of Science and Engineering*; Vol. 07 (01), 2016, 020-033.

24. **S. M. Varedi** · H. M. Daniali · M. Farajtabar, "The effects of joint clearance on the dynamics of 3RRR planar parallel manipulator", *Robotica*, Volume 35, , June 2017 , pp. 1223-1242.

25. H.M. Daniali, **S.M. Varedi**, M. Dardel, A. Fathi, "A Novel Algorithm for Kinematic and Dynamic Optimal Synthesis of Planar Four-bar Mechanisms with Joint Clearance", *Journal of Mechanical Science and Technology*, 29 (5) (2015) 2059-2065.

26. **S.M. Varedi**, H.M. Daniali, M. Dardel, A. Fathi, "Optimal Dynamic Design of a Planar SliderCrank Mechanism with a Joint Clearance", *Mechanism and Machine Theory* 86 (2015) 191–200.

27. **S.M. Varedi**, H.M. Daniali, M. Dardel, "Dynamic Synthesis of a Planar Slider-Crank Mechanism with Clearances", *Nonlinear Dynamics*, (2015) 79:1587–1600.

28. **S.M. Varedi**, H.M. Daniali, M. Dardel, A. Fathi, "Dynamic Behavior Analysis of a Planar Fourbar Linkage with Multiple Clearances Joint", *International Journal of Engineering (IJE)***,** TRANSACTIONS B: Applications Vol. 28, No. 2, (February 2015) 243-250.

29. M. Farajtabar, H.M. Daniali, **S.M. Varedi**, "Pick and place trajectory planning of planar 3-RRR parallel manipulator in the presence of joint clearance", *Robotica,* available on CJO2015. doi:10.1017/S0263574714002768, Published online: 03 March 2015.

30. **S.M. Varedi**, H.M. Daniali, M. Dardel, A. Fathi, "Optimal Compliant Design of a Planar Linkage for Decreasing the Undesirable Effects of Joint Clearance", *Modares Mechanical Engineering*, Vol. 14, No. 5, pp. 55-62, 2014 (In Persian).

31. **S.M. Varedi**, H.M. Daniali, M. Dardel, A. Fathi, "Kinematic and Dynamic Optimization of a Planar Four-Bar Linkage with Joint Clearance", *Sharif Mechanical Engineering*, Vol. 30-3, No. 2/2, pp. 97-104, 2014 (In Persian).

32. Arash Sardashti, H.M. Daniali, **S.M. Varedi**, Optimal free-defect synthesis of four-bar linkage with joint clearance using PSO algorithm, *Meccanica*, Volume 48, Issue 7, (2013), 1681-1693.

33. Arash Sardashti, H.M. Daniali, **S.M. Varedi**, Optimal Free-Defect Function Generation Synthesis of Four-Bar Linkage With Joint Clearance Using PSO Algorithm, *Journal of Science and Engineering,* Vol. 1 (1), (2013), 67-78.

34. Saeed Rastegar, Bahram Azizollah Ganji, **Mojtaba Varedi**, Mehran Erza, Application of He′s variational iteration method to the estimation of diaphragm deflection in MEMS capacitive microphone, *Measurement* 44 (2011) 113–120.

35. **S.M. Varedi**, H.M. Daniali, D.D. Ganji, Kinematics of an offset 3-UPU translational parallel manipulator by the homotopy continuation method, *Nonlinear Analysis: Real World Applications* 10 (2009) 1767–1774.

36. **S.M. Varedi**, D.D. Ganji, M. Rajabi, Analytical Approaches for System of Nonlinear Equations Arising in Melting of a Finite Slab, *International Journal of Modern Physics B*, Vol. 23, No. 2(2009) 209–222.

37. SHA. Hashemi Kachapi, D.D. Ganji, A.G. Davodi and **S.M. Varedi**, Periodic solution for strongly nonlinear vibration systems by He's variational iteration method, *Mathematical Method in Applied Sciences* (2009), 32: 2339–2349.

38. **S. M. Varedi**, H. M. Daniali, Direct kinematic of the Tip- Tilt- Piston parallel manipulator by the homotopy continuation method, *International Journal of Nonlinear Dynamics in Engineering and Science,* 1:2 (2009) 171-179.

39. D.D. Ganji, **S.M. Varedi**, M. Rahimi, Application of Analytical Methods to Some Systems of Nonlinear Equations Arising in Fluid Flows with Variable Viscosity, *Journal of Energy, Heat and Mass Transfer*, vol.30, pp:287-310, (2008).

40. **S.M. Varedi**, M.J. Hosseini, M. Rahimi, D.D. Ganji, He s variational iteration method for solving a semi-linear inverse parabolic equation, *Physics Letters A*, (2007) 275-280.

Book Chapters:

1. M. Falahian, H.M. Daniali and **S.M. Varedi** (2012). Optimization of H4 Parallel Manipulator Using Genetic Algorithm, *Serial and Parallel Robot Manipulators - Kinematics, Dynamics, Control and Optimization*, Dr. Serdar Kucuk (Ed.), ISBN: 978-953-51-0437-7, InTech.

Conference Papers:

2. **Seyyed Mojtaba Varedi-Koulaei**, Mahdi Mokhtari, Trajectory tracking solution of a robotic arm based on optimized neural network, *6th International Conference on Robotics and Mechatronics (ICROM 2018)*, October 23-25, 2018, Iran University of Science and Technology, Tehran, Iran.

3. Amir Hossein Feizi, Mohammad Haddad Zarif, Mostafa Nazari, **Seyyed Mojtaba VarediKoulaei**, Push Recovery Control of NAO Humanoid Robot Based on capture point, *6th International Conference on Robotics and Mechatronics (ICROM 2018)*, October 23-25, 2018, Iran University of Science and Technology, Tehran, Iran.

4. **S. Mojtaba Varedi-Koulaei**, Hamid M. Daniali, Milad Shafiei, Optimal Synthesis of a Planar Slider-Crank Mechanism with Clearance Joints, *3nd RSI International Conference on Robotics and Mechatronics (ICRoM 2015)*, Tarbiat Modares University, Tehran, Iran on October 7-9, 2015.

5. **S. Mojtaba Varedi**, Hamid M. Daniali, Morteza Dardel, Alireza Fathi, Dynamic behavior analysis of a planar four-bar linkage with three clearance joints, *2nd RSI International Conference on Robotics and Mechatronics (ICRoM 2014)*, K. N. Toosi University of Technology, Tehran, Iran on October 15-17, 2014.

6. Omid Heidari, Hamid M. Daniali, **S. Mojtaba Varedi**, Dynamic behavior analysis of a planar four-bar linkage with three clearance joints, *2nd RSI International Conference on Robotics and Mechatronics (ICRoM 2014),* K. N. Toosi University of Technology, Tehran, Iran on October 15-17, 2014.