Hadi Eslamnia

OpenSees, Python and MATLAB Expert

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Structural engineer with 10000+ hours of experience in researching and tutoring OpenSees and structural programming and with +100000 lines of programming. Experienced in nonlinear modelling and analysis of a variety of structural systems, i.e., buildings and bridges with different seismic resistance systems. Teaching +250 MS and PhD students worldwide during one-on-one training sessions.

EDUCATION

Amirkabir University of Technology — **Tehran**
2015-2017

- Master of Science in Structural Engineering
- **Thesis Title:** Evaluation of Seismic Performance Factors of Buckling Restrained Braced Frames (BRBFs)
- GPA: 17.49/20

Jundi-shapur University of Technology

- Bachelor of Science in Civil Engineering
- GPA: 17.78/20

EXPERIENCES

- + 100000 lines of programming (Python, MATLAB and TCL)
- + 10000 hours of researching about nonlinear modelling and analysis of structures
- +2000 one-on-one training sessions for more than 250 MS and PhD students worldwide
- +200 hours of published online video courses
- +7000 answers to questions about nonlinear analysis concepts questioned by MS and PhD researchers in research groups
- 6 published papers and 3 under review papers

PROFESSIONAL AND REASEARCHING EXPERIENCE

Teaching — **Online**
February 2018-Present

- Teaching MATLAB, TCL and Python programming to civil engineers and researchers and help them to code necessary algorithms
- Teaching nonlinear structural modelling and analysis using OpenSees finite element framework
- Teaching designing steel moment frame and buckling moment frame structures using SAP2000/ETABS
- Teaching parametric analysis and design using ETABS API and Python

Online Video Courses

February 2018-Present

- Introduction to OpenSees, parametric modelling and analysis of steel and concrete structures (2D modelling)
- Parametric 3D modelling of steel and concrete structures
- Introduction and concepts of FEMA P695 method
- Incremental dynamic analysis using fixed-step and Hunt-Fill methods using OpenSees (TCL and Python courses)
- Nonlinear modelling and analysis of highway bridges using OpenSees (the only video course about this issue worldwide)
- Nonlinear modelling and analysis of Concrete Shear Wall structures
- Nonlinear modelling and analysis of Concentrically Braced Frames (CBFs)
- Nonlinear modelling and analysis of Eccentrically Braced Frames (EBFs)
- Nonlinear modelling and analysis of Buckling-Restrained Braced Frames (BRBFs)
- Nonlinear modelling and analysis of Special Truss Moment Frame

Structural Modelling Experience

February 2018-Present

Moment Frames

- Steel Moment Frame using distributed plasticity (Fiber model)
- Steel Moment Frame using lumped plasticity (Ibarra-Krawinkler model)
- Concrete Moment Frame using distributed plasticity (Fiber model)
- Concrete Moment Frame using lumped plasticity (Ibarra-Krawinkler model)
- *Special Truss Moment Frame*
- *Modular Steel Building*
- Concrete-Filled Tube Frame (CFT)

Braced Frames

- Concentric Steel Braced Frame
- Eccentric Steel Braced Frame with Shear Link
- Buckling Restrained Braced Frame
- Strongback Braced Frame
- High-Rise Steel Building with Outrigger and Belt Trusses

Walls

- Concrete Shear Wall
- Hybrid Coupled Wall System with Steel and Concrete Coupling Beam
- Masonry Wall
- Infilled Wall in Steel and Concrete Frame
- Insulated Concrete Form System (ICF)

Dampers and Base-Isolators

- Viscous Damper
- Friction Damper
- Yielding Steel Damper
- Tuned Mass Damper (TMD)
- Triple Friction Pendulum Isolator
- Single Friction Pendulum Isolator
- Elastomeric Bearing Isolator

Self-Centring Systems

- Self-Centring Wall system
- Braced Frame equipped with SMA
- Self-Centring Column Base Connection
- Self-Centring Beam to Column Connection

Soil

- Soil-Shallow Foundation Interaction (Winkler model)
- Soil-Shallow Foundation Interaction (direct model)
- Soil-Pile-Structure Interaction (Winkler model)
- Soil-Tunnel interaction (direct model)

Bridge systems

- single frame bridge system
- multi-frame bridges system
- cable stayed bridge system
- Bridge detailing:
    - Deck and Piers with Different Section Shapes
    - Shear Key
    - Backfill Soil
    - Pile
    - Pounding
    - Bearing Pad
    - Restrainer

Optimization

- Steel moment frame optimization based on performance levels (IO, LS, CP) by OpenSees and MATLAB
- Topology optimization of steel braced frame with SMA and soil interaction by OpenSees and MATLAB
- Optimization of tall building outrigger structural system by Python and ETABS API
- Optimization of shear wall structures by OpenSees, Python, MATLAB and ETABS API

Other Systems or Subjects

- Hybrid simulation using UT-SIM
- FRP Confined Concrete
- Progressive Collapse
- Pounding between Structures
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PROGRAMMING SKILLS

MATLAB

- Advanced in procedural programming
- Coding various advanced algorithms related to structural and seismic fields
- Teaching programming by MATLAB for structural and seismic purpose

Python

- Advanced in procedural programming
- Coding various advanced algorithms related to structural and seismic fields
- Teaching programming by Python for structural and seismic purpose

TCL

- Advanced in procedural programming (necessary for OpenSees)

ENGLISH LANGUAGE

Licence

- MSRT Total Score: 82/100

Skills

- Advanced in reading, speaking, listening and writing

PUBLICATIONS

1. Eslamnia, H., Malekzadeh, H., Jalali, S. A., & Moghadam, A. S. (2023). Seismic energy demands and optimal intensity measures for continuous concrete box-girder bridges. Soil Dynamics and Earthquake Engineering, 165, 107657.

2. Farajian, M., Sharafi, P., Eslamnia, H., Kildashti, K., & Bai, Y. (2022). Classification of inter-modular connections for stiffness and strength in sway corner-supported steel modular frames. Journal of Constructional Steel Research, 197, 107458.

3. Farajian, M., Kildashti, K., Sharafi, P., & Eslamnia, H. (2022, November). Quantification of seismic performance factors for modular corner-supported steel bracing system. In Structures(Vol. 45, pp. 257-274). Elsevier.

4. Farajian, M., Sharafi, P., Bigdeli, A., Eslamnia, H., & Rahnamayiezekavat, P. (2022). Experimental Study on the Natural Dynamic Characteristics of Steel-Framed Modular Structures. Buildings, 12(5), 587.

5. Farajian, M., Sharafi, P., Eslamnia, H., Bai, Y., & Samali, B. (2023, March). Classification system for inter-modular connections in non-sway corner-supported steel modular buildings. In Structures(Vol. 49, pp. 807-825). Elsevier.
6. Mirzai, N. M., Eslamnia, H., Sina Bakhshinezha, S., Jeong, S. H. (2023). Seismic fragility assessment of a multi-span continuous I-girder bridge controlled by a self-centering damper. In Structures. Elsevier.

7. Probabilistic seismic demand model for Continuous Concrete Box-Girder Bridges Considering Hysteretic Energy and Residual Demands (Journal paper – under review)

8. Development of seismic fragility functions for close-spaced reinforced masonry shear walls (Journal paper – under review)

9. Seismic fragility of non-ductile and limited ductile reinforced concrete shear walls under in-plane loading conditions (Journal paper – under review)