

# Curriculum Vitae ( Resume)



## Personal Information :

First name: Amin  
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## Current Positions

- Member of the Academic Board, Department of Electrical and Robotics Engineering. Eqbal Lahoori Institute of Higher Education ([www.eqbal.ac.ir](http://www.eqbal.ac.ir)).
- Invited Lecturer, Department of Computer Engineering. Bahar Institute of Higher Education ([www.baharihe.ac.ir](http://www.baharihe.ac.ir)).
- Supervisor of the Digital Laboratories ( Microprocessors, Logical Circuits, Computer Architecture, Digital Communication).
- Supervisor of several students' final project.

## Education

- M.S. in Control and System Engineering from *Ferdowsi University of Mashhad*, 2010, *Department of Electrical Engineering* ([www.um.ac.ir](http://www.um.ac.ir)), GPA: 18.02 (Out of 20.00).
  - M.S. Thesis:
    - **Title:** *Tracking of High Maneuvering Target in Wireless Sensor Networks Using IMM Filter and Triangulation-Based Target Localization.*
    - **Grade:** 19.00 on a 20-point scale, under supervision of Dr. Naghibi Sistani ([mb-naghibi@um.ac.ir](mailto:mb-naghibi@um.ac.ir)).
- B.S. in Electrical Engineering with emphasis on Electronics Engineering from *technical university of Sistan and Baluchestan, Department of Electrical Engineering* ([www.usb.ac.ir](http://www.usb.ac.ir)), Feb 2006. Two terms in Ferdowsi university of Mashhad as a guest student.
  - B.S. Thesis
    - **Title:** *Design an Automatic Television Antenna using 8051 and AVR.*
    - **Grade:** 20 on a 20-point scale, under supervision of M.S.Eng. Safari ([msaffari1340@gmail.com](mailto:msaffari1340@gmail.com)).

## Research Interests

- Nonlinear Control and State Estimation, Artificial Intelligence, Machine Learning, Reinforcement Learning, Robotics, Sensors and Actuators, Industrial Automation, Networked Control Systems.

## **Teaching Experience**

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|--|--|---|
| ✓ Electrical Circuits I (3 semesters)        | ✓ Applied Electronics                  | ✓ Technical English for computer (software) students  |
| ✓ Electrical Circuits II                     | ✓ Linear Control Systems (2 semesters) | ✓ Technical English for ICT students(2 semesters)   |
| ✓ Introduction to Artificial Neural Networks | ✓ Signals and Systems                  | ✓ Technical applications (Matlab & Pspice programming and simulating, PLC S7-400 programming) |
| ✓ Electromagnetics                           |  |   |

## **Certificates**

- Introduction to GSM cellular network architectures , Intelligent Networks, Site structures and EDGE & GPRS technologies and SS7 signaling principles, 2010.
- SIEMENS PLC (Programmable Logic Controller) LOGO. Shargh Automation Course APL 48, 2003 Mashhad,Iran.
- Uninterruptable Power Supplies, Introduction and Maintenance, Shargh Automation, 2003, Mashhad, Iran.
- CompTIA Network+, IT Technical Course, Pasargad Informatics Institute, 2007, Mashhad, Iran.
- Programming of PLCs, S7-300,400, airtec pneumatic ([www.airtec.de](http://www.airtec.de)), FSCO Iran Agency 2008, Mashhad, Iran.

## **Memberships**

- IEEE St. member , 2009 – Now.
- IEEE Region 8 Student Branch.
- Society for Industrial and Applied Mathematics (SIAM) Student Member.
- SIAM Activity Group (SIAG) on Control and Systems (C&S) Member .
- SIAM Activity Group (SIAG) on Discrete Mathematics (DM) Member .
- International Association of Engineers (IAENG) Member.

## **Research and Work Experience**

- *Internship*: F.H.R Co, Consulting and implementing the UPS and Emergency power systems.
  - Working in the Company as a Technical consulter.
- *Design & Build*
  - Designing and building a Line Tracker Robot.
  - Designing a fully differential amplifier with HSPICE as a project of Electronics (III) course.
  - Design a controller for a Dynamics of 2-DOF manipulator as a project of Modern Control Systems course under supervision of Dr. Akbarzadeh.
- *Research & Simulation*
  - Member of the research group of ECU project in Iranian National Automotive industry.

- A research and a presentation on Turbofan Jet Engines as a project of General Workshop.
- A research and a presentation on Dot Matrix, Bubble Jet, and Laser Jet printers.
- A research and comprehensive report on Uninterruptable Power Supplies as a report of Internship course.
- Literature Survey on Tracking a Target in Wireless Sensor Networks as a research of Seminar Course.
- Some MATLAB Simulations about nonlinear control methods such as Robust Nonlinear Control and Digital Control Systems.
- Some PSPICE simulation of Analogue transistor circuits under supervision of Dr. Reza Lotfi.
- *Other*
  - Set the Questions of sample national MSc entrance exam in Electronics, Technical English for Electrical Engineering Students and Linear Control Systems , 2008, Sanjesh Takmili, Iran.

## **Publications**

- **Amin Hassani**, M.B Naghibi.S, “Reinforcement Learning Based Control of Tumor Growth with Chemotherapy” *2010 IEEE International Conference of System Science and Engineering (ICSSE 2010)*.
- M. H. Bahari, **Amin Hassani**, “Intelligent Identification of Process Noise Covariance Matrix for Maneuvering Target Tracking” *2010 IEEE International Conference of System Science and Engineering (ICSSE 2010)*.
- **Amin Hassani**, Arash Khatamianfar , “Robust Control of a MEMS Optical Switch Using Fuzzy Tuning Sliding mode” , *International Conference on Control, Automation and Systems 2010 (ICAS 2010)*.
- **Amin Hassani**, Farzad Nejati Moharrami, “ Maneuvering Target Tracking Using IMM and Adaptive Process gain Scheduling in Wireless Sensor Networks.” 2011 19<sup>th</sup> Iranian Conference of Electrical Engineering (*ICEE2011*).
- **Amin hassani**, M.B Naghibi.S, “IMM-Triangulation based Tracking of high maneuvering target in wireless sensor networks using Intelligent Identification of Process Noise”, *8<sup>th</sup> IEEE international conference on Networking, Sensing and Control, Delft, The Netherlands*.
- **Amin Hassani**, Mohammad Hossein Yaghmaee Moghadam, “Localization of Rotating Object Using Novel Adaptive Fuzzy-IMM in Wireless Sensor Networks “ submitted to Elsevier Computer Communication journal.
- **Amin Hassani**, “ Networks of Wireless Sensors” published in Persian, ESCAPE Computer Scientific Magazine, Ferdowsi University of Mashhad, Iran.

## Languages:

- **English** : Advanced
- **Française** : élémentaires.
- **Persian** : Mother tongue, Native Speaker.

## Skills

- Electrical Engineering Softwares: MATLAB, SIMATIC Step7, Orcad Pspice, Hspice, and EWB.
- Assembly Languages: 8085, 8051.
- Programming Languages: C, Bascom (AVR Microcontroller Programming Language), LAD/FBD/STL (PLC Programming Language).
- Other Software: Microsoft Word, Microsoft PowerPoint, Microsoft Visio, Autocad and some graphical software.
- Familiar with Network Devices such as DSL routers, Switches, Wireless Access points, and Network topologies and wirings.
- Personal Computer Hardware and assembling.
- Operating System UNIX and MAC OS.

## References

### 1. Dr. Asad Azemi, Associate Professor.

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Faculty of Engineering, Ferdowsi University of Mashhad (FUM).

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### 2. Dr. Mohammad Hassan Neshati, Associate Professor.

Faculty of Engineering, Department of Electrical Engineering, Ferdowsi University of Mashhad (FUM).

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Abstract of my Master of Science Thesis, entitled:

## “Tracking of High Maneuvering Target in Wireless Sensor Networks Using IMM Filter and Triangulation-Based Target Localization “

Amin Hassani.

Ferdowsi University Of Mashhad, Department of Control and systems.

Wireless Sensor Networks (WSNs) which has been made viable by the convergence of micro electro-mechanical systems technology, wireless communications and digital electronics, provide a new paradigm for sensing and disseminating information from various environments, with the potential to serve many and diverse applications. Current WSNs typically communicate directly with a centralized controller or satellite. On the other hand, a smart WSN consists of a number of sensors spread across a geographical area; each sensor has wireless communication capability and sufficient intelligence for signal processing and networking of the data. Sensor nodes are capable of solving a variety of collaborative problems, such as, monitoring and surveillance. One of the critical components in wireless sensor networks is the tracking of mobile targets. Maneuvering target tracking is an important application in wireless sensor network (WSN). Usually, Kalman Filter (KF) or extended Kalman Filter (EKF) is used to predict and estimate target states. However, when a target has high maneuverability, KF or EKF always does not work well. In this thesis, we employ distributed interactive multiple model (IMM) filter to estimate target position and velocity that incorporates a novel energy-efficient sensor scheduling scheme in a distributed WSN using low cost range wireless sensor nodes.

The heart of the tracking system consists of two components, namely: the data association module and the kinematics state estimation module. Triangulation based target localization is considered for the first part in this thesis in the field of wireless sensor nodes. Dynamic group scheduling is also proposed for managing the sensor selection process. For the second part we apply IMM in which multiple models run in parallel manner, where the final target state is the combined state based on mode probability. The mode probability is computed using the residual of measurement. Linear “constant velocity”(CV) and nonlinear “coordinated turn” (CT) models have been applied in filter. Accuracy of the proposed schemes are evaluated using computational simulation in MATLAB. Being comprehensive, different scenarios and Monte Carlo runs for filters have been considered to make the comparison fair. Moreover, to improve the level of performance according to the estimation accuracy, we propose Fuzzy Logic Inference (ILF) system to adaptively change the level of model noise covariance matrix.



