Mohammadmahdi (Mahdy) Maharebi

M.Sc. Student – Electrical Communication Engineering

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Professional Summary

M.Sc. student with a **solid analytical and computational background** in electromagnetics, RF/microwave engineering, computational photonics, and signal processing. Experienced in developing and validating numerical solvers (FDTD, FEM, eigenmode methods) and working with reproducible research workflows. Silver medalist in Iran's National Physics Olympiad. Seeking a funded Master's thesis in electromagnetics, antenna design, or optical modelling.

Education

M.Sc. Electrical Communication Engineering   2024–Present
University of Kassel, Germany
GPA: 1.53/1.0 (sehr gut)
Key courses: Microwaves (1.0), Optoelectronics (1.0), Engineering Mathematics (1.0), Digital Communications Lab (1.3), Digital Communications (1.7).
Focus areas: computational EM, photonics, optimization, signal processing.

B.Sc. Electrical Engineering   2017–2023
Sharif University of Technology, Iran
Focus on electromagnetics, microwave engineering, and signal processing.
Teaching Assistant: Circuit Analysis I (Head TA), Circuit Analysis II, Object-Oriented Programming in Java.

Research Experience

2D FDTD PEC Cavity Solver   2025
Python/NumPy – Computational Electromagnetics

○ Developed TMz FDTD solver with CFL-stable update equations.

○ Validated five cavity eigenmodes with 0.43% mean error.

○ Implemented FFT-based mode extraction with probe averaging.

○ Produced convergence plots and animations in a reproducible workflow.

Fiber Mode Perturbation Analysis   2025
Python/SciPy – Operator Theory & Numerical Methods

○ Derived first-order sensitivities of β and n_{eff} under fabrication variations.

○ Implemented eigenmode solvers with $< 0.1\%$ numerical error.

○ Produced tolerance maps for realistic refractive-index and radius deviations.

○ Developed manuscript-ready figures and reproducible analysis scripts.

Selected Engineering Projects

Antenna & RF Design Portfolio   2021–2023
HFSS / ADS / MATLAB

○ Designed a 16 dBi horn antenna with optimized matching.

○ Modeled a phased dipole array with mutual coupling analysis.

○ Designed a 3 dB branch-line coupler with >20 dB isolation.

Adaptive FEM Visualization Tool   2023
C# / WPF

○ Implemented a tool for FEM field visualization and mesh reconstruction.

○ Integrated Delaunay triangulation and automated parsing routines.

Technical Skills

Computational EM: FDTD, FEM post-processing, eigenmode solvers, perturbation analysis
RF Tools: HFSS, ADS, CST; S-parameters, array factor analysis
Programming: Python, MATLAB, C++, C#, TypeScript/React
Research Tools: LaTeX, Git/GitHub, Jupyter, Linux/Bash
Domains: EM simulation, photonics, antennas, microwaves, signal processing, 5G/6G

Awards & Distinctions

Silver Medal – National Physics Olympiad   2017
Iran

National Elites Foundation Recognition   2017
Government of Iran

Languages

English: Professional
German: A2.1 (actively improving)
Persian: Native

Links

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