Hassan El Bouz

Quantum Engineering Student, ETH Zurich
Zurich, Switzerland | Email: helbouz@ethz.ch | Phone: +41 79 475 11 76
GitHub: github.com/Habouz | LinkedIn: linkedin.com/in/hassan-el-bouz-444895177/

Education

M.Sc. in Quantum Engineering, ETH Zurich — Zurich, Switzerland *2025 – 2027*

B.S. in Physics and Pure Mathematics, American University of Beirut — Beirut, Lebanon *2022 – 2025*

- GPA: 4.22/4.0 • Merit Scholarship (Early Admission), AUB Honor List (all semesters)
- Awards: Muhanna Foundation Award (Mathematics), Teddy Christidis Award (Physics), Dr. Mohammad Chatah Excellence Award
- Relevant Coursework: Computational Physics & ML, Advanced Quantum Mechanics, Applied Probability (Markov Chains), Symmetries in Physics

Projects

Dynamic Structure Autoencoder (Capstone) — Python, PyTorch *2025*

- Built a self-adaptive neural network that dynamically reduces latent space dimension and hidden layer sizes during training.
- Applied to MNIST, achieving unsupervised image generation and compression.
- Extended entropy-based methods to enable **self-pruning autoencoders**, improving sparsity and efficiency.

Publications

- Hassan El Bouz, supervised by Prof. Giuseppe Della Sala. *On the local behavior of chains on strongly pseudoconvex hypersurfaces in C^3*. Proceedings of the American Mathematical Society, Vol. 153, No. 7, 2025. Link.

Research Experience

On Chains on Strongly Pseudoconvex Hypersurfaces — AUB · Math Dept *Jun 2023 – Jun 2024*

- Classified hypersurfaces via Fefferman's metric and studied null geodesics.
- Derived Chern–Moser normal form conditions; published in *Proceedings of the AMS*.

Spatio-Temporal Epidemiology Model with Memory — AUB · Math Dept *Jun 2024 – Jun 2025*

- Developed a stochastic integro–differential epidemic model; proved existence/uniqueness via functional analysis.
- Implemented solvers (Runge–Kutta + custom schemes) in Python/MATLAB; submitted for publication.

Distributed Quantum Systems — AUB · Engineering Dept *Nov 2024 – Jul 2025*

- Analyzed conditions under which two-qubit gates can be teleported.
- Evaluated efficiency and cost of gate cuts for arbitrary gates.

Skills

Programming: Python, C++, MATLAB, Java, LaTeX
Frameworks: PyTorch, NumPy, Pandas, Git, Linux, Qiskit
Domains: Quantum Information, Machine Learning, Numerical Optimization, Algorithms
Seminars/Teaching: Delivered talks on Chern–Moser theory, spatio-temporal epidemic models, and Jordan Canonical Forms. Tutored at AUB Math Center and led outreach campaigns.