Amirhossein Rezaei

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Education

Shahid Beheshti University — Tehran, Iran
B.Sc. in Physics; ***GPA: 3.54/4.00*** — *Sep 2019 – Jun 2023 (Expected)*

Shahid Madani High School, NODET — Tabriz, Iran
National Organization for Development of Exceptional Talents — *Sep 2013 – Jun 2017*

Research Experience

Research Papers

- Abbaslu, S., S. Rostam Zadeh, A. Rezaei, and S. S. Gousheh. 2021. "Effects of Nonhelical Component of Hypermagnetic Field on the Evolution of the Matter-Antimatter Asymmetry, Vorticity, and Hypermagnetic Field." Physical Review D 104 (5).
- Rezaei, A. and Mokhtari, P., A new method for predicting the behavior of the COVID-19 epidemic in Italy.
- Rezaei, A. A review on Gödel's incompleteness theorem, its simple proof, and its connection to quantum gravity.

Teaching Assistant

- Physics I, Assistant to Dr. Sadeghi

Related Activities

Physics Student Association of Shahid Beheshti University

- Elected Member, Main Council of Physics Student Association, Shahid Beheshti University (2022-2023)
- Volunteered and campaigned for the position, receiving support from students through votes.
- Coordinated events and activities for students interested in physics and related fields.
- Organized weekly seminars and workshops featuring guest speakers from academia and industry.
- Collaborated with other student organizations to promote science education and outreach in the community.

Relevant Courses and Grades

Introduction to Artificial Intelligence	$17.5/20$
Biophysics	$20/20$
Complex Systems	$19/20$
Mathematical Physics II	$19.5/20$
Physics Project	$20/20$
Astronomy and Astrophysics	$17.5/20$
Foundations of Numerical Simulations	$20/20$
Nuclear and Elementary Particle Physics	$17.51/20$
Thermodynamics and Statistical Mechanics I	$17.3/20$
Analytical Mechanics I	$17.75/20$
General Topology	$14.5/20$
Aesthetics and Philosophy of Art	$16/20$

Projects

RKF | *GitHub*

- RKF: Implementation of Runge-Kutta Fehlberg method in pure Python to numerically solve system of ODEs.

A Numerical Recipes Project | *GitHub*

- A Numerical Recipes Project: Solving a Stiff System of ODEs using Rosen- Brock Method in C++.

Cerebrum Atlas | *GitHub*

- This package can generate a 3D representation of the brain and plot MNI or TAL coordinates onto it, while also returning the corresponding area names.

Complex-Systems | *GitHub*

- A repository of Complex Systems ideas and codes.

Comprehensive Database of Pollen Grains | *Medium*

- This project leverages the vast amount of data available on the PalDat website to create a valuable resource for deep learning.

Optimizing the Ising model in Python | *Medium*

- This project involves simulating a 2D ISING model using various techniques such as utilizing the fast Numba JIT Compiler, implementing parallel processing with Numba's prange, performing branch-less computation, utilizing a lookup table for the exponential function, and optimizing further with a custom random number generator.

Ideas Under Development

- A highly accurate semi-automatic deep learning procedure based on confidence score to reduce the overburden pressure of medical staff for screening COVID-19 from CT scan images (on hold).
- Rapid seismic damage assessment of Jacket Offshore platforms using time series classification-based deep learning techniques via Bayesian fine-tuning (in the process; the first paper is in the preprint process, and the second paper is in the coding part).
- Classification of Intracranial Field Potentials in Human Visual Cortex via Convolutional Deep Neural Network (This work is in process with Dr. Abdoos from SBU's Computer Engineering department, Dr. Jafari from SBU's Physics department, Miss Nik, and a neuroscientist in Montreal.)

Skills

Programming: Python, C, C++, MATLAB, Mathematica, Maple

Tools and Technologies: TensorFlow, Keras, Scikit, SciPy, Pandas, MNE, Matplotlib, NumPy, Git

Languages: Persian (Native), English, Azerbaijani, Turkish