

Noise-Robust Optimal Sampling Strategy for Multi-scale Complex Systems Using Deep Reinforcement Learning

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Overview

This repository hosts the MATLAB code for the project “Noise-robust Optimal Sampling Strategy for Multi-scale Complex Systems Using Deep Reinforcement Learning,” by Phat K. Huynh, Dang Nguyen, and Trung Q. Le. The project focuses on developing optimal sampling strategies for modeling multi-scale complex systems, specifically addressing challenges in noise robustness and scalability for high-dimensional systems.

Repository Structure

- **Coupled_systems/**: MATLAB scripts and functions related to the case studies involving coupled systems, including the Van der Pol oscillator and the slow Lorenz system.
- **FIGURE_code/**: Scripts to generate figures presented in the paper, illustrating the results and performance of the algorithms.
- **Lorenz/**: Contains MATLAB files specifically for the case study involving the Lorenz system.
- **Wendling_system/**: MATLAB scripts and data pertaining to the Wendling neural mass model case study.

Getting Started

Prerequisites

Ensure you have MATLAB installed on your computer (preferably MATLAB R2020a or later).

Running the Scripts

1. Clone or download this repository to your local machine.
2. Open MATLAB and navigate to the cloned repository's directory.
3. Each folder contains specific scripts for different parts of the project:
 - Navigate to *Coupled_systems/*, *Lorenz/*, or *Wendling_system/* for respective case studies.
 - Run the desired MATLAB scripts within these folders to execute the case studies.
 - To generate figures, navigate to *FIGURE_code/* and run the corresponding scripts.

Contributing

Contributions to this project are most welcome. Please follow these guidelines to contribute:

1. Fork the repository.
2. Create a new branch for your feature or bug fix.
3. Commit your changes and open a pull request.

Contact

For inquiries, feel free to reach out to any of the authors:

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