Focus Project:
On Pseudo-Random Number Generators

Simone Spedicato, BSc

2025S 280522-1 Methods of Computational Astrophysics, 30/06/2025
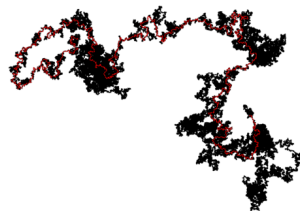
Introduction

Goals:

- Explore how psuedo-random number generators (PRNGs) work.
- Test the limitations of various PRNGs.
- Apply PRNGs to the modeling of a star cluster.

Methods:

- Literature review on PRNGs.
- Implement PRNGs and test suites.
- Simulate a star cluster using PRNGs.

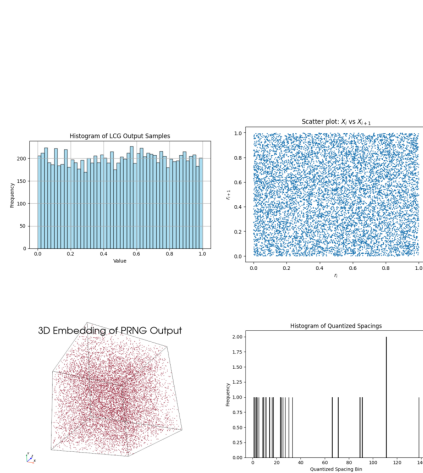Random walk in 2D (Wikimedia Commons, CC BY-SA 4.0)

Outlook

Done:
- LCGs, Mersenne Twister, Common Entropy Sources, RANDU.
- Basic test suite.

Next Steps:
- More test scenarios.
- Comparison with simulations.
- Write the report.

Preliminary test results for the LCG.