Econophysics — Lecture Notes

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Preface

These notes are intended to serve as a supplementary resource for the Econophysics course within the master's program in Physics at the University of Pavia.

The complete source code of these lecture notes is freely available on GitHub at the following repository:

https://github.com/lordpunz/econophysics-lecture-notes.git

Readers who notice typographical errors or encounter any other issues are kindly invited to submit a pull request describing the problem. Contributions of this kind are greatly appreciated and will be addressed as promptly as possible.

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Chapter 1

Introduction

These lecture notes provide a compact introduction to econophysics, aimed at students in the Master's program. This first chapter is a short, fictional text to verify that compilation and fonts work correctly.

1.1 What is econophysics?

Econophysics is an interdisciplinary field applying methods from statistical physics to problems in economics and finance. Common topics include: random walks, scaling laws, agent-based models and network analysis.

1.1.1 A tiny example: random walk

A discrete time random walk can be written as

$$X_{n+1} = X_n + \xi_n,$$

where ξ_n are i.i.d. steps with zero mean and variance σ^2. After n steps, by the central limit theorem,

$$\frac{X_n}{\sqrt{n}} \xrightarrow{d} \mathcal{N}(0, \sigma^2).$$

1.2 Figures and images

Here is an example figure inclusion (file should be placed in 'images/'):

1.3 Checklist

- Check that compilation with LuaLaTeX succeeds: math and text render correctly.
- Verify table of contents entries are clickable and no boxes are visible.
- If you have Minion Pro locally, verify the Minion look is used.

Figure 1.1: Example figure (replace with your own).