Additional material on the SYMMYS Lab

Day 1

P vs Q: the worlds of quantitative finance Preface

The "Checklist": modular steps of ARPM Executive Summary

Invariance and the random walk Chapter 1a

- Equities: log-returns Section 1a.1
- Fixed income: changes in yield to maturity Section 1a.2
- Derivatives: (log) changes in vol. surface Section 1a.3

Advanced dynamics in discrete time

- Autocorrelation and AR(1) processes Section 1b.2 (Subsection 1b.2.1)
- ARMA processes and Wold's theorem Section 1b.2 (Subsection 1b.2.1.4) and Section 1b.7 (Subsection 1b.7.2)
- Long memory: fractional integration Section 1b.3
- Volatility clustering: GARCH Section 1b.4

Advanced dynamics in continuous time

- Random walk: Levy processes Section 3.1
- Autocorrelation: Ornstein-Uhlenbeck Section 3.1 (Subsection 3.1.2.1)
- Long memory: fractional Brownian motion Section 3.1 (Subsection 3.1.3)
- Volatility clustering: stochastic volatility Section 3.1 (Subsection 3.1.4.1)
- Volatility clustering: subordination Section 3.1 (Subsection 3.1.4.2)

Projection to investment horizon Chapter 3

- Analytical projection Section 3.1 and Section 3.2
- Numerical projection: Fast Fourier Transform; simulations Section 3.4 and Section 3.5 (Subsection 3.5.3)
- Annualization of skewness, kurtosis, etc. / Square-root/linear risk ellipsoid propagation Section 3.5 (Subsection 3.5.2)