Dynamic Pricing with Discrete-Time Affine Processes

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Objectives

This course shows how discrete-time affine processes can be used to derive asset prices and to model their dynamics. A first part presents the discrete-time affine processes and their properties. It highlights the richness of these processes and shows how they can conveniently be incorporated within asset-pricing frameworks. A second part presents various applications. It focuses in particular on the pricing of commodity-related financial products, interest rates, credit, liquidity, contagion and systemic risks.

Course Outline

I. **Discrete Time Affine Processes and Asset Pricing Strategies**

    a. Multi-horizon Laplace Transforms, Truncated Laplace Transforms

    b. Discrete Time Affine Processes (Markov Chains, Switching Gaussian, Gamma, V-ARG, Wishart processes)

    c. Absence of Arbitrage Opportunities, Stochastic Discount Factor, Risk-Neutral Dynamics, Modeling Strategies

II. **Applications**

    a. Pricing of Commodity Derivatives (Forwards, Futures, Options), Convenience Yields

    b. Pricing of Risk Free and Defaultable Bonds

    c. Disentangling Credit and Liquidity Risks

    d. Pricing Credit Events, Disastrous Defaults and Contagion

Material

- The course material is available online, in html format, at:
  https://jrenne.github.io/TSM_bookdown/.

- The material is also available in a pdf format at:
  https://github.com/jrenne/TSM_bookdown/blob/main/docs/TSM.pdf.