

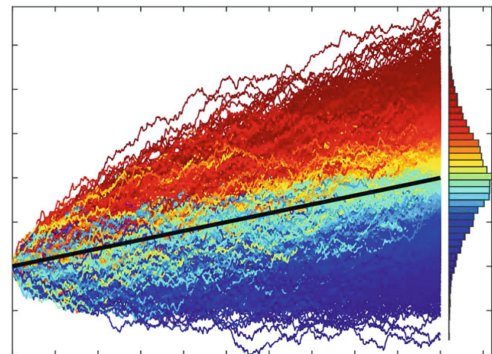
Thesis or Project on algorithmic trading

- Automatic trading by optimal decision-making -

Job description

What's the difference between a PhD in math and a large Pizza? The pizza can feed a family of four. Although not every mathematician makes a fortune, Jim Simons definitely proves this joke wrong. He made approximately 23.5 billion US-Dollars by modeling the stock market and optimizing his trading decisions by, e.g.,

$$\begin{aligned} \max_u \mathbb{E} & \left[\int_0^T F(t, X_t, u_t) dt + \Phi(X_T) \right] \\ \text{subject to} \quad & dX_t = \mu(t, X_t, u_t) dt + \sigma(t, X_t, u_t) dW_t \\ & X_0 = x_0 \\ & u_t \in U(t, X_t). \end{aligned}$$



In fact, optimal decision-making under stochastic influences is a control problem at its heart and highly relevant in many disciplines, such as *management, trading, production, transportation and logistics,* Hence, we are interested in developing and applying novel techniques in this field.

During your work, *possible* tasks are the

- development and test of control algorithms for decision-making, e.g., model predictive control or reinforcement learning
- modeling of stochastic processes
- application of machine learning methods
- data acquisition, pipelining, and backtesting

Your profile

You are ambitious and like to learn new things about control and finance? Perfect! Ideally (not necessary), your expertise encompasses some of these fields

- optimization (quadratic programming, nonlinear programming, ...)
- stochastic (hidden markov models, bayesian processes, stochastic differential equations, ...)
- machine learning (neural networks, ...)
- coding (C++, Python, or Matlab)

Of course, we provide support whenever you need help. Your work can be done in English or German.

Interested?

Do not hesitate to contact us via nils.schlueter@tu.dortmund.de with *relevant information*.