

# State Space Modelling for Statistical Arbitrage

Supervisors: N. Kantas (Imperial) & J. Kiskiras (HSBC)

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This project is aimed to investigate the practical benefit of using more complex modelling than what is currently standard practice in applications related to statistical arbitrage. The underlying assets will be modelled using appropriate mean-reverting time series or state space models. In order to fit these models to real data the project will involve using advanced particle methods such as Particle Markov Chain Monte Carlo. The primary aim of the project is to assess whether using more advanced modelling and model calibration will result to better performance than simple models used often in practise. This will be illustrated in numerical examples, where the computed portfolio is used for a realistic scenario obtained by popular trading platforms. Simulations will be mainly run in Matlab, but embedding C/C++ routines may be required to speed up computations. The project is a challenging computational Statistics application to finance and is this suitable for a student with an interest in finance, very good appetite to computing and understanding of the material in the course related to Monte Carlo methods and Time Series.

Prerequisites:

- Courses:
  - Further Topics in Statistics (essential)
  - Time series, Financial econometrics, Pricing and Hedging in Financial Markets (desired)
- Very good computing skills will be advantageous.

External Partners: Dr John Kiskiras, HSBC, who will provide guidance on topics related to practical aspects of the application. The student will be required to attend meetings with both supervisors.