

# ALGORITHMIC AND HIGH-FREQUENCY TRADING

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## Abstract

With the availability of high frequency financial data, new areas of research in stochastic modeling and stochastic control have opened up. This mincourse will introduce some of the basic concepts, questions and methods that arise in this domain. We will begin with a description of the basic elements of electronic markets, some of the features of the data, its empirical implications and simple microeconomic models. Next, we will investigate algorithmic trading problems from the stochastic optimal control perspective, including the optimal execution problem and show how to modify the classical approaches to include order-flow information and the effect that dark pools have on trading. Electronic markets would not exist without market markets, so we next investigate how market makers with various trading goals and constraints post orders. We conclude this mincourse by studying a classical algorithmic trading method – trading pairs of assets that mean-revert, however, here we will see how stochastic control methods can be utilized to inform agents how to optimally trade.

[ This mincourse is based on our new book:

***Algorithmic and High-Frequency Trading***,

published by *Cambridge University Press*

Álvaro Cartea (Oxford U.), Sebastian Jaimungal (U. Toronto) and José Penalva (U. Carlos III de Madrid). ]