

Scientific Seminar for ECP 2009-2010

Designing a Trading Robot that Implements Derivatives Strategies on the Market

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September 16, 2009

Abstract

This project is about creating a series of trading robots that will trade different strategies that exist in a trading room. For confidentiality reasons, we can not mention them here, however, the aim will be to understand the quintessence of each trading style in the derivatives universe and create a robot that mimicks the trading style of a human trader. Trading strategies covered will include merger arbitrage, volatility trading and other strategies.

Keywords: derivatives pricing, trading strategies, stochastic volatility, Monte Carlo simulation, jump diffusion process, variance swaps.

1 Research Steps

The preliminary research will be based on the understanding of all trading styles in a trading room. We will explain to you how a trading room makes money on all the different trading desks. You will then implement a trading strategy with our in-house softwares that, if successful, will trade on the live markets. Across the year, you will implement a minimum of three different strategies.

2 Tools Given by Arbitragis

Selected students will need to be very proficient in C++ and quantitative finance. They will leverage on our internal tools that will help them generate tangible results quickly. Market data across European and US markets will be readily available for number crunching. The subject has a strong finance / trading bias, but requires a very good knowledge of C++ : students need ideally to be familiar with inheritance, multithreading, parallel computing, polymorphism.

3 What you will gain from this experience

You will gain a massive expertise in C++ and in quantitative finance that will be useful for your career as future Traders or Quants. Your knowledge and understanding of derivatives and trading strategies will be extremely high. We will help you study and develop calibration methodologies in order to try and design real-life trading strategies. You will benefit from a very competent staff which will help you if you need and which will help you so that you spend as much time as possible doing research rather than be stuck in pure IT issues.

Eventually, you will benefit from our trading methodologies, know-how, and vision.

During your spare time, you will be allowed to trade on X-Trader, on our in-house simulated market platform.

4 Example of previous work with ECP academics and students

Arbitragis has already cooperated with ECP on numerous subjects related to computational finance and derivatives pricing. Here is a non-exhaustive list:

- Teaching of *Computational Finance with Graphics Processing Units*, Applied Mathematics class, January 2010 with Ioane Muni Toke [Click here for the schedule and the agenda.](#)
- Study of Earthquake Predictions Applied to Financial Crashes. Michael Martos, ECP 2008
- Lookback Options Pricing and Trend Following Strategies. Francois Bouscarle & Fabien Charbonnel, ECP 2008
- Levy Laws used in Derivatives Pricing, Geoffrey Gascq, ECP 2008
- Statistics and Market Predictions, Otakar Frank, ECP 2008
- Massively Parallel Quasi Monte Carlo, Grégoire Jauvion, ECP 2009
- Pricing of Futures on Volatility, Cyril Neyme, Kevin Maurice-Vallerey, ECP 2009
- Hedge Fund Strategies Analysis, Jean-Romain Derote, Rémi Quilliet, ECP 2009
- Visualization of High Frequency Market Data, Raphael Megzari & Hugo Delaborde, ECP 2010
- Algorithmic Music derived from Stock Market Prices, Nicolas Thomas, Romain Davroux, Emmanuel Losada, ECP 2011
- Creation of a World-Class Computing Go game, Kevin Trouilleux, Pierre-Jean Stalter, Mikhail Gorodilin, Florent, ECP 2011

5 How to apply ?

Please send a resume in pdf form to stages@arbitragis.com. This document can also be found on <http://www.arbitragis-research.com>.