

# Internship Subject 2009-2010

## Building a Quantitative Analysis Tool to Price Equity Derivatives

Arbitragis Trading, Paris, France

October 12, 2009

### Abstract

Equity derivatives pricing is a complex task and requires lots of data crunching : historical volatility, implied volatility, dividend levels, credit default swap levels, financial analysis etc.... Analyzing such heterogenous data requires trading expertise and a software. We have built an in-house powerful software in C++ that allows us to have a very good understanding of a specific stock. We are looking for students who would be willing to help us continue and build this software.

*Keywords:* derivatives pricing, C++, Soap, client-server, data mining, extreme programming, back-testing, multithreading, applied mathematics.

## 1 Who are we ?

*Arbitragis Trading* is a leader in quantitative trading. We build our own models and softwares in order to trade financial markets with a highly quantitative bias. Most of our trading is done by our computers that trade the markets without human intervention. Trading is done with our own capital, which allows us to be extremely creative in the Research and Development process.

We also like to maintain a close relationship with the academic world : we also teach computational finance at Ecole Centrale Paris [Click here for the schedule and the agenda.](#), and you will also take advantage of our research and vision.

## 2 Internship subject

We propose an internship subject that aims at improving our internal software. Coding will be in C++. Improvements will consist of different steps:

-building a client server engine based on SOAP that allows a smooth exchange of financial data between applications,

-refactoring (i.e. improving the design and the giving it an even more oriented object aspect) our software in order to improve the architecture and the design. A very good understanding of object oriented programming and of design patterns will be needed. Ideally a previous understanding of notions of extreme programming will be welcome,

-programming new in-house analytics that will help understanding the behaviour of the underlying stock.

## 3 Development Steps

You will be provided with a good understanding of the equity product. Then, understanding the Soap protocol in C++ and see how to use Soap to transfer financial data from the server to the client application. Then, you will try and understand our software (30K lines) in order to see how to refactor it in a more oriented object way. A training on refactoring techniques will be provided.

## 4 Tools Given by Arbitragis

Selected students will need to be extremely proficient in C++. Ideally, they will have programmed more than 10000 lines of codes in C++ before coming. Do not apply if you are not good in C++ and if you do not like this language.

## 5 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 developers of high-level financial applications. Your knowledge and understanding of derivatives will be extremely high. You will benefit from a very competent staff which will help you if you need so that you spend as little time possible.

Eventually, you will benefit from our trading methodologies, know-how, and vision. You will benefit from the expertise of a competent and available staff that will help you whenever you need. Our development methodologies based on agile programming and our expertise in financial markets will allow you to develop a superb application within an extremely short period of time.

Our alumni work in trading rooms at JP Morgan, SocGen, Citibank or BNP. Some continue their studies at El Karoui's DEA or Harvard.

## 6 How to apply ?

Please send a resume in PDF form only to [stages@arbitragis.com](mailto:stages@arbitragis.com). This document can also be found on <http://www.arbitragis-research.com>.

## 7 Who should apply ?

Students from INSA, Ensimag, Epita / Epitech, EFREI and other computer science schools,

## 8 Internship dates

Dates are flexible starting from January 2010 or later, for 3 months or more.