Advanced Financial Modeling

Matteo Sani

MPS
CAPITAL SERVICES

The Course

- Due to some delays the course schedule has been condensed. All the lessons will be held in just 6 weeks.

Weekday	Room	Time
Monday	1[1]	10-12
Tuesday	1	18-19.30
Wednesday	1	18-19.30
Thursday	13	10-12

- What about next Monday ?

[1] Except 15^{th} of May Room 6

Syllabus

- The aim of the course is to provide the students with the necessary background to start a career as a trader or a quantitative analyst in a Financial Institution.
- The focus is on Fixed Income Derivatives and XVAs. Detailed references will be given and teaching materials will be handed during the lectures.
- Attendance to the lectures is warmly recommended.

Syllabus

Main topics covered:

1. Review of the pricing approaches to Fixed Income Derivatives in the old framework with a critical focus on the underlying hypotheses
2. The change of measure technique
3. A primer on market models and Black Formula for Caps and Swaptions
4. The segmentation of the interest rate markets after the 2008 Crisis and the new multicurve approach
5. The monetary Policies of the Central Banks, the advent of negative rates and the need for models allowing for negative yields
6. Pricing and hedging with the Smile: stochastic volatility and local volatility models
7. Short Rate Models
8. Topics in Credit Risk Modeling with a crash Primer
9. Introduction to XVAs. Definitions, methods and open problems

Recommended Books

Here is a list of Books we recommend to anyone who wants to become an accomplished professional in the field of Quantitative Finance (Trader, Quant, Risk Manager):

1. Hull, John. Options, *Futures And Other Derivatives*, Pearson College, last edition
2. Bjork, Thomas. *Arbitrage Theory in Continuous Time*, OUP, 4th edition
3. Brigo Damiano and Mercurio Fabio, *Interest Rate Models Theory and Practice, with Smile, Inflation and Credit*, Springer Verlag, 2006
4. Rebonato, Riccardo. *Volatility and Correlation: The Perfect Hedger and the Fox*, Wiley and Sons, 2004
5. Derman, Emanuel. *The Volatility Smile: An Introduction for Students and Practitioners*, Wiley, 2016
6. Taleb, Nassim. *Dynamic Hedging: Managing Vanilla and Exotic Options*, Wiley and Sons, 1997
7. Coen, Guy. *The Bible of Options Strategies: The Definitive Guide for Practical Trading Strategies*, Ft Pr; Reprint 2015-06-05

Recommended Books

1. Bennet, Colin. *Trading Volatility: Trading Volatility, Correlation, Term Structure and Skew*, CreateSpace Independent Publishing Platform, 2014
2. Brigo Damiano, Morini Massimo, Pallavicini Andrea. *Counterparty Credit Risk*, Collateral and Funding: With Pricing Cases for All Assets. Wiley and Sons, 2013
3. Gregory, John. *The xVa Challenge: Counterparty Risk, Funding, Collateral, Capital and Initial Margin*, Wiley and Sons, 2020
4. Neftci, Salih and Hirsa, Ali. *An Introduction to the Mathematics of Financial Derivatives*, Academic Press, 2013