**市场微结构模型专题课程介绍**

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| **课程中文名称** | 市场微结构模型专题 | **课程学分** | 2 |
| **课程英文名称** | Topics in Market Microstructure Models  | **课程学时** | 32学时 |
| **授课对象** | A、校内计划课程（限本校学生） |
| **授课时间** | 7月11日至7月27日，每周一、周三、周五的5-8节（13:00-17:00） |
| **先修课程** | 微积分，线性代数，概率论，随机过程 | **授课语言** | 英语 |
| **教师姓名** | 王太和(Tai-Ho Wang) |  |  |
| **中文课程简介**本课程旨在介绍及探讨与市场微结构相关的数学，经济及物理模型。基于应用所须，本课程前一小段将着重于时间序列分析与统计学习相关知识的简介。学生修完成课程应具备对市场微结构模型的基础知识及其与应用相关的技术。 |
| **英文课程简介**The course aims at introducing market microstructure models from economics, mathematics, and physics viewpoints. In order to prepare the student into the core, the first half of the course offers a crash course on time series analysis and the theory of statistical learning. The second half will cover modeling of limit order book, price impact models, problem of optimal execution, and algorithmic trading strategies. Upon completion, students are expected to understand the market microstructure models covered in the course and possess basic skills to implement the models. |
| **教学大纲**基本目的: 了解市场微结构模型及其在实务上的应用。内容提要及相应学时分配: * Background materials (8学时)
1. Crash course on stochastic calculus and stochastic control
2. Time series analysis
3. Statistical learning
* Economics models (8学时)
1. Inventory models
2. Information based models
3. Information and the price process
* Market models (8学时)
1. Market vs limit order decision
2. Statistical arbitrage strategy and mean reversion trading
* Price impact models and their related optimal execution schemes (8学时)
1. Modeling of market impact
2. Optimal execution strategies
3. Algorithmic trading with learning

教学方式: 课堂讲授: 100%学生成绩评定办法: 作业: 60%, 期末考: 40% |

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|  | **作者译者** | **书名** | **出版社** | **出版年** |
| **参考书（必须填写，不得少于10部）** | **1** | O’Hara | Market microstructure theory | Wiley | 1998 |
| **2** | Hasbrouck | Empirical market microstructure | Oxford University Press | 2007 |
| **3** | De Jong and Rindi | The microstructure of financial market | Cambridge University Press | 2009 |
| **4** | Foucault, Pagano and Roell | Market liquidity: Theory, evidence and policy | Oxford University Press | 2013 |
| **5** | Lehalle and Laruelle | Market microstructure in practice | World Scientific Publishing Company | 2013 |
| **6** | Cartea, Jaimungal and Penalva | Algorithmic and high-frequency trading  | Cambridge University Press | 2015 |
| **7** | Abergel et al | Market microstructure: confronting many viewpoints | Wiley | 2012 |
| **8** | Vives | Information and learning in markets: the impact of market microstructure | Princeton University Press | 2010 |
| **9** | Durbin | All about high-frequency trading | McGraw-Hill Education | 2010 |
| **10** | Johnson | Algorithmic trading and DMA | 4Myeloma Press | 2010 |
| **任课教师教学和科研简历（必填信息：出生年月、所在院系/单位、入校工作时间、研究方向和常用邮箱、教学科研成就；可另附页）**王太和 (Tai-Ho Wang)Email: tai-ho.wang@baruch.cuny.eduWebpage: http://mfe.baruch.cuny.edu/tai-ho-wang-2/现职: 纽约市立大学巴鲁学院数学系教授, 2012/09迄今最高学历: 台湾交通大学应用数学博士, 2000/06研究方向: 数量金融及金融工程经历:纽约市立大学巴鲁学院数学系副教授, 2008/09 ~ 2012/08台湾中正大学数学系副教授, 2006/09 ~ 2008/08台湾中正大学数学系助理教授, 2002/09 ~ 2006/08纽约大学库朗学院博后研究, 2001/09 ~ 2002/08台湾中央研究院数学所博后研究, 2000/09 ~ 2002/08金融相关著作:1. (with Xue Cheng and Marina Di Giacinto) *Optimal execution with uncertain order fills in Almgren-Chriss framework*, Quantitative Finance, 17(1), 55-69, (2017)2. (with Jim Gatheral) *Implied Volatility from Local Volatility: A Path Integral Approach*. Springer Proceedings in Mathematics & Statistics, Vol. 110, *Large Deviations and Asymptotic Methods in Finance*, 247-271, (2015)3. Book Review on *Nonlinear Option Pricing* by J. Guyon and P. Henry-Labordère, Quantitative Finance, 15(1), 19-21, (2015)4. (with [Jim Gatheral](http://faculty.baruch.cuny.edu/jgatheral/)) [*The Heat-Kernel Most-Likely-Path Approximation*.](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1663318)[International Journal of Theoretical and Applied Finance](http://www.worldscinet.com/ijtaf/), 15(1), 1250001 (2012)5. (with [Jim Gatheral](http://faculty.baruch.cuny.edu/jgatheral/), [Elton Hsu](http://www.math.northwestern.edu/people/facultyProfiles/elton.hsu.html), [Peter Laurence](http://www.math.nyu.edu/~laurence/), and [Cheng Ouyang](http://www.math.purdue.edu/~couyang/)) [*Asymptotics of Implied Volatility in Local Volatility Models*.](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1542077)[Mathematical Finance](http://www.wiley.com/bw/journal.asp?ref=0960-1627&site=1), 22(4), 591~620 (2012)6. (with Peter Laurence and Sheng-Li Wang) *Generalized Uncorrelated SABR Models with a High Degree of Symmetry.* [Quantitative Finance](http://www.tandf.co.uk/journals/rquf), 10(6), 663-679 (2010)7. (with Peter Laurence) *Sharp Distribution Free Lower Bounds for Spread Options and the Corresponding Optimal Subreplicating Portfolios.*[Insurance: Mathematics and Economics](http://www.elsevier.com/locate/ime), 34(1), 35-47 (2009)8. (with Peter Laurence) *Distribution Free Upper Bounds for Spread Options and Market Implied Comonotonicity Gap.* [The European Journal of Finance](http://www.tandf.co.uk/journals/titles/1351847X.asp), 11(8), 717-734 (2008)9. (with Peter Carr and Peter Laurence) *Generating Integrable One Dimensional Driftless Diffusions.* [Comptes Rendus Mathematique Academie des Sciences, Paris.](http://www.elsevier.com/wps/find/journaldescription.cws_home/600301/description), 343(6), 393-398 (2006)10. (with Peter Laurence) *Close Form Solutions for Quadratic and Inverse Quadratic Term Structure Models.* [International Journal of Theoretical and Applied Finance](http://www.worldscinet.com/ijtaf/), 8(8), 1059-1083 (2005)11. (with [David Hobson](http://www2.warwick.ac.uk/fac/sci/statistics/staff/academic/hobson/) and Peter Laurence) *Static-arbitrage Optimal Sub-replicating Strategies for Basket Options.* Insurance: Mathematics and Economics, 37, 553-572 (2005)12. (with David Hobson and Peter Laurence) *Static-arbitrage Upper Bounds for the Prices of Basket Options.* Quantitative Finance, 5(4), 329-342 (2005)13. (with Peter Laurence) *Sharp Upper and Lower Bounds for Basket Options.* [Applied Mathematical Finance](http://www.tandf.co.uk/journals/titles/1350486X.asp), 12(3), 253-282 (2005)14. (with Peter Laurence) *What’s a basket worth?*[Risk Magazine](http://www.risk.net/), February, 73-74 (2004) |