

MTH9879 Market Microstructure Models

Dmitry Rakhlin and Tai-Ho Wang



Coordinates

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Teaching Assitants

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Important dates

- Thu, Jan-25-2024: first class
- [Thu, Feb-22-2024: no class, Monday schedule](#)
- [Thu, Apr-25-2024: no class scheduled, spring break](#)
- Thu, May-09-2024: last class, review for final
- [Thu, May-16-2024: Final exam \(tentative\)](#)

Class meeting time and venue

- Time: 6:05pm ~ 9:05pm, Thursdays
- Venue: VC11-165

Software and packages

- Programming language: python
- Platform: Jupyter notebook/lab
- Packages: matplotlib , numpy , pandas , scipy , statsmodels , scikit-learn , etc

Syllabus (subject to change)

- *Market mechanisms*
- *Theoretical and empirical models of the order book*
- *Inventory models and market making*
- *Rational expectations and models of strategic trading*
- *Sequential trade models*
- *Understanding the bid-ask spread*
- *Variance and covariance estimation*
- *The long memory of order flow*
- *Models of market impact*
- *Market impact of meta-orders*
- *Price manipulation*
- *Optimal execution strategies*
- *Modeling latency*
- *Optimal order routing algorithms*

Schedule of lectures

- Week 01, Jan-25-2024: Lecture 01 **Zero intelligence model**
- Week 02, Feb-01-2024: Lecture 02 **Order book and order flow**
- Week 03, Feb-08-2024: Lecture 03 **Inventory models and market-making**
- Week 04, Feb-15-2024: Lecture 04 **Understanding the bid-ask spread**
- Week 05, Feb-29-2024: Lecture 05 **The Kyle model**
- Week 06, Mar-07-2024: Lecture 06 **Volatility estimation**
- Week 07, Mar-14-2024: Lecture 07 **Long memory**
- Week 08, Mar-21-2024: Lecture 08 **Market impact**
- Week 09, Mar-28-2024: **Trading game**
- Week 10, Apr-04-2024: Lecture 09 **The Almgren-Chriss model**
- Week 11, Apr-11-2024: Lecture 10 **Transinet impact models**
- Week 12, Apr-18-2024: Lecture 11 **Portfolio optimization and transaction cost**

- Week 13, May-02-2024: **Lightening presentation**
- Week 14, May-09-2024: **Review for final**
- Week 15, May-16-2024: **Final exam (tentative)**

Note

- *Dates for trading game and lightening presentation are subject to change.*
- Lectures 1 to 6 will be conducted by Tai-Ho while Lectures 7 to 11 by Dmitry.