

# Announcement WiSe 2024/25

## Lecture in Mathematical Finance

### Advanced Seminar

### U-statistics and Bootstrap

Prof. Dr. Aleksey Min

**Area: / Modulnr.:** Mathematical Finance/ MA6015

**Content:** Maximum mean discrepancy is a popular measure in machine learning community. Asymptotic distribution of estimators for this measure can be established with U-statistics. Four bachelor students will present classical asymptotic theory of U-statistics from the book by Koroljuk and Borovskich. Four master students will present advanced materials from the selected papers.

**Continued next Semester:** No

**Audience:** 4 bachelor students and 4 master students

**Prerequisite:** For bachelor students-MA0009, for master students-MA3408, advanced knowledge of probability and statistics is recommended

**Literature:**

- 1. Koroljuk, V and Borovskich, Yu. (1994).** *Theory of U-statistics*. Springer Science + Business Media, B. V.  
Springer-Link: <https://link.springer.com/book/10.1007/978-94-017-3515-5>
- 2. Bickel, P. and Freedman, D. (1981).** Some asymptotic theory for the bootstrap. *Annals of Statistics*, 9(6).  
DOI: <https://doi.org/10.1214/aos/1176345637>
- 3. Arcones, M. and Gine, E. (1992).** On the bootstrap of U and V statistics. *Annals of Statistics*, 20(2).  
DOI: <https://doi.org/10.1214/aos/1176348650>
- 4. Arcones, M and Gine, E. (1994).** Limit theorems for U-processes. *Annals of Probability*, 21(3). DOI: <https://doi.org/10.1214/aop/1176989128>
- 5. Arcones, M and Gine, E. (1994).** U-processes indexed by Vapnik Červonenkis classes of functions with applications to asymptotics and bootstrap of U-statistics with estimated parameters. *Stochastic processes and their Applications*, 52 (1).  
DOI: [https://doi.org/10.1016/0304-4149\(94\)90098-1](https://doi.org/10.1016/0304-4149(94)90098-1)

**Certificate:** 3 CP

**Seminar information:** The preliminary online-meeting to the seminar (Online Seminar vorberechung) will take place on **June 20, at 18:00** in ZOOM. Please write an e-mail to [min@tum.de](mailto:min@tum.de) to get an access to this ZOOM-meeting.