

Further Topics in Statistics and Probabilities

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Classes start the second week of the semester.

Group Collège d'Économie:
Wednesday, 16h–19h00
Centre Assas, room 401.

Group CMI EFiQuaS:
Thursday, 16h–19h00
Centre Assas, room 401.

Content. In this class, we will review the fundamental concepts of probability theory and apply them to problems in mathematical economics. We will in particular discuss models of interactive knowledge and belief revision as they have been introduced by Robert Aumann's article "Agreeing to disagree" (1976).

Competences. Coherent mathematical reasoning; distinguishing formal proofs of arguments from interpretations; reading and discussing original research papers in English; preparing writing assignments and presentations on formal topics in English.

For our meetings in class you can bring:

- your notes from other, previous and current, classes on statistics ("Statistique 2" second semester of last year, and current course "Statistique 3") as well as any other books or lecture notes. You are allowed and encouraged to use this material for individual and group work in class.

Evaluation for this class is based on:

- your participation during the sessions, including individual and group work, presentations of written assignments, and
- a final written exam, which will take place in the second to last session of the course.

Program

Session 1: Introduction, the basic model and review of general definition of probability spaces, σ -algebras, partitions, etc.

Session 2: Modeling information and beliefs about events: Aumann's 1976 model, including a review of Bayes' Law

Session 3: Aumann's (1976) theorem on common knowledge and agreement

Session 4: Aumann's theorem: interpretation and extensions

Session 5: Bayesian Dialogues

Session 6: Communication via alternate bets

Session 7: Other extensions and applications of Bayesian dialogues

Session 8: Summary and conclusions

Session 9: FINAL EXAM

Session 10: Discussion of final exam

References

- [1] Aumann, Robert J. 1976. "Agreeing to Disagree." *The Annals of Statistics* 4, 1236–1239.
- [2] Geanakoplos, John and Herakles Polemarchakis. 1982. "We can't disagree forever." *Journal of Economic Theory* 28, 192–200.
- [3] Sebenius, James K. and John Geanakoplos. 1983. "Don't bet on it : contingent agreements with asymmetric information." *Journal of the American Statistical Association* 78 (382), 424–426.
- [4] Savage, L. 1954. *The Foundations of Statistics*. New York: Wiley.
- [5] Pawlowitsch, C. 2020. *Dialogues Aumanniens*. Working Paper.
- [6] Williams, David. 1991. *Probability with Martingales*. Cambridge, UK: Cambridge University Press.