

Journées MAS 2022 - Foreword

The *Journées MAS*¹ have constituted for more than 25 years one of the main events bringing together the French community in probability and statistics. Every two years, this conference takes place over 3 days and showcases the most recent advances on a large selection of topics of the field. During plenary, parallel and poster sessions, it gathers a varied ensemble of speakers, including both young and more experienced researchers and coming both from the academic and the industrial world.

The 2022 edition was held in Rouen from August 29 to 31, 2022. The 6 plenary guests were C. Garban, G. Biau, V. Bansaye, J.-F. Coeurjolly, I. Marcovici and M. Rosenbaum. Moreover, B. Dembin, J. Mourtada and A. Riera gave three additional plenary talks as they were awarded the 2020 and 2021 Jacques Neveu Prize, given each year to one or two PhDs in probability and statistics defended in France. The 20 parallel sessions focused on a rich collection of topics in probability, in statistics or at the interface with other domains and the industry.

This volume gathers a representative selection of contributions from this event, namely those of two plenary speakers and five parallel sessions.

J.-F. Coeurjolly proposes, in a joint work with I. Ba and A. Choiruddin, the study of an inference problem related to spatial statistics, namely the estimation of intensity and conditional intensity for inhomogeneous spatial point processes. This reproduces and is inspired by some elements from his presentation during the conference.

I. Marcovici provides an overview of recent problems on cellular automata and self-organization phenomena that she has recently tackled and discussed during her talk. This field lies at the interface of dynamical systems, statistical mechanics and mathematical informatics.

The session devoted to *Limit theorems* and organized by O. Durieu has given birth to a survey paper which summarizes the talks given by the four guests: L. Colombani, D. Giraudo, V. Pilipauskaitė and L. Reding. The topics covered include asymptotics for cumulative processes, scaling limits for network traffic models and invariance principles for U -statistics and for random fields.

The contribution related to the session entitled *Random walks* and organized by K. Raschel includes an overview of three of the four guest speakers, namely Q. Berger, C. Bonnet and L. Laulin. Several subjects are presented there: estimates for the persistence of both discrete and continuous integrated stochastic processes, applications of random walks to biology through the asymptotic study of a multi-scale modeling for rest hematopoiesis and limit theorems for a particular random walk with memory called the elephant random walk.

Functional data analysis is the core of the session organized by E. Devijver. Three from the four guest speakers, J. Cugliari, A. Meynaoui et R. Mignot, have participated to the contribution which surveys their respective talks. The recent advances which are discussed here include notably a general overview of modern techniques, the notion of barycenter of multivariate functional data and the adaptive nonparametric estimation in the functional linear model.

The session entitled *Artificial intelligence* and organized by M. Hebiri is represented by a paper related to two of the four invited presentations. This contribution concerns the use of a MCMC method for asynchronous deep learning and is due to M. François, P. Gay, S. Lebeaud, S. Loustau, J. Palafox, F. Kiné Sow and N. Tirel.

Finally, E. Lépinette, J. Baptiste and L. Carassus introduce a new approach in financial asset pricing theory without the use of martingale measures in the contributed work associated with the session on *Optimization in finance* organized by E. Lépinette.

We warmly thank the authors of these seven contributions and we are also very grateful to all the people who have helped us in preparing this volume: the SMAI and MAS committee, the scientific and organizing committee of the *Journées MAS 2022*, the referees of the manuscript and the team at ESAIM Proceedings.

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¹MAS = Random and Statistics Modeling (Modélisation Aléatoire et Statistique in French)