



## Editorial: Special issue on the workshop ‘Modern Applied Probability’

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Received: 23 July 2021 / Revised: 24 July 2021 / Accepted: 26 July 2021 /

Published online: 13 August 2021

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This special issue contains a selection of papers written by the participants of the workshop *Modern Applied Probability* which was held on 15–17 May 2019 at ICMS, The Bayes Centre, Edinburgh. This workshop was organised by Denis Denisov (Manchester University) and Seva Shneer (Heriot–Watt University) and made possible by the generous support of the London Mathematical Society.

The workshop was dedicated to the celebration of the 65th birthday of Sergey Foss. The conference was attended by many colleagues and former students of Sergey Foss. Almost 30 talks were given; they presented recent developments in diverse areas of applied probability.

The special issue includes three papers. In the first of them, *A multiplicative version of the Lindley recursion* by Onno Boxma, Andreas Löpker, Michel Mandjes and Zbigniew Palmowski, the authors consider the stochastic recursion  $W_{i+1} = (V_i W_i + Y_i)^+$ , that can be interpreted as an autoregressive process of order 1 reflected at 0, and derive transient and stationary results for three cases of the distribution of  $V_i$ . Transient results are in terms of the transform at a geometrically distributed epoch.

In the second paper, *Maximum on a random time interval of a random walk with infinite mean*, Denis Denisov considers a random walk with jumps having either infinite or undefined mean and right heavy-tailed distribution. Under the assumption that the random walk drifts to minus infinity almost surely, the author studies the maximum until the first descending ladder epoch. To this end, the author introduces and studies properties of a natural generalisation of the class of subexponential distributions. If the jump distribution belongs to this class, the tail of the maximum is asymptotically equivalent to the tail of the jump times the expected value of the first descending ladder epoch.

The third paper, *On Itô formulas for jump processes* by István Gyöngy and Sizhou Wu, is related to Itô formulas in finite and infinite dimensions. While Itô’s formula

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for finite dimensions is well understood, there are some settings, say in filtering theory of partially observed jump diffusions, that call for further clarification and careful consideration of the assumptions. The authors revisit the chain rule for finite-dimensional Itô–Lévy process. In the second part of the paper, the authors discuss infinite-dimensional generalisations of the Itô formula from the point of view of applications to stochastic partial differential equations.

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Editors of the Special Issue

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