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EDITORIAL

Preface

This special issue is devoted to the Mathematical Analysis of Algorithms, which aims to predict the performance of fundamental algorithms and data structures in general use in Computer Science. The simplest measure of performance is the expected value of a cost function under natural models of randomness for the data, and finer properties of the cost distribution provide a deeper understanding of the complexity. Research in this area, which is intimately connected to combinatorics and random discrete structures, uses a rich variety of combinatorial, analytic and probabilistic methods.

The present special issue contains a small number of invited papers growing out of extended abstracts which were presented at the 27th International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms held in Kraków, Poland, in July 2016. All extended abstracts of this conference are indexed in MathSciNet and Zentralblatt MATH; the proceedings are available at www.aofa.tcs.uj.edu.pl/proceedings/aofa2016.pdf.

Contributions

Aumüller, Dietzfelbinger, Heuberger, Krenn and Prodinger address dual-pivot quicksort algorithms, a subject which has received much attention in recent years. They show that a particular partitioning strategy is optimal with respect to the expected number of key comparisons. Poblete and Viola study hashing with the Robin Hood collision resolution strategy. They find a bound for the variance of the search cost by solving asymptotically the associated differential equation. Drmota, Magner and Szpankowski's contribution is on the number of random queries required to recover a hidden bijective labelling of n distinct objects. The question was first raised by Alfréd Rényi in 1960. The present contribution is on an asymmetric version and the results are related to the height, fill-up level and typical depth of PATRICIA tries under the asymmetric Bernoulli model. Rasendrahasina, Rasoanaivo and Ravelomanana investigate the maximum block size of the random Erdős–Rényi graph near its critical point. Using methods from analytic combinatorics they obtain asymptotics of the expected value in two regimes at the transition. Kuba and Panholzer consider two stochastic growth models for series-parallel networks. Their analysis is based on an underlying recursive tree structure and on methods from analytic combinatorics. In particular, limit laws for the degree of the poles and for the length of a random source-to-sink path are derived. Ralaivaosaona and Wagner study additive cost measures of random d-ary increasing trees and generalized plane-oriented increasing trees. Conditions on the toll-function are given that guarantee central limit laws for the cost measures. Collet, Drmota and Klausner examine planar maps where the degrees of the vertices are restricted to a given set of integers. Using analytic methods they derive a multivariate central limit law for the numbers of vertices of given degrees.

Extended versions of the papers of Aumüller, Dietzfelbinger, Heuberger, Krenn and Prodinger and of Drmota, Magner and Szpankowski are available at the repository arXiv.org.

We are grateful to the managing editors of *Combinatorics, Probability and Computing* for the opportunity to prepare this special issue, and we thank them for their unfailing support and guidance through the whole process. We hope that the readers will find this issue interesting and useful for their own scientific work.

Hsien-Kuei Hwang
Ralph Neininger
Marek Zaionc

(Guest editors)