

# Asymptotic expansions for the profile of random trees

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Binary search trees and their variants are of prime importance in computer science allowing for efficient execution of database operations such as insertion, deletion and retrieving of data. Their properties have been analyzed over the last thirty years (and longer) by various techniques of analytic, combinatorial and probabilistic kind. In this talk, I discuss a very refined statistic describing their shape, the so-called tree profile counting the number of nodes of a given depth. In this context, I will present a family of novel strong functional limit theorems settling several open problems raised in Devroye and Hwang [2006], Fuchs, Hwang and Neininger [2006], and Drmota and Hwang [2005] on the width of the tree (i.e. the maximal number of nodes on any level) and the mode of the profile (i.e. the level where the width is attained). The talk is based on joint work with Zakhar Kabluchko (Münster) and Alexander Marynych (Kyev).