

Height and saturation level of random digital trees

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The height is one of the most important and widely-used performance measures for evaluating the efficiency of tree-based data structures. For symmetric digital search trees, one of the basic classes of digital trees, Aldous and Shields raised at the end of the 80s a problem concerning the distribution of the height. A non-rigorous solution of this problem was presented at the beginning of the millennium by Knessl and Szpankowski. Moreover, their method gives more detailed information on the distribution of the height and also applies to the height of symmetric PACTRICIA tries (another basic class of digital trees). In recent years, big strides have been made towards rigorous proofs of all these results. In this talk, we will explain why all this progress became possible and that the new methods can also be applied to asymmetric digital trees and quantities closely related to the height such as the saturation level. In particular, we will present our (now fully rigorous) solution of the original problem of Aldous and Shield. This talk is based on joint work with Michael Drmota (Technical University of Vienna), Hsien-Kuei Hwang (Academia Sinica) and Ralph Neininger (Goethe University).