

# 國立交通大學應用數學系

## 學術演講公告

主講人：Bernhard Gittenberger (Vienna University of Technology)

講題：Enumeration of unary-binary tree-like structures with restrictions on the unary height

時間：106年2月21日(星期二) 下午 1:25 –2:10

### Abstract

We consider various classes of Motzkin trees as well as lambda-terms for which we derive asymptotic enumeration results. These classes are defined through various restrictions concerning the unary nodes or abstractions, respectively: We either bound their number or the allowed levels of nesting. The enumeration is done by means of a generating function approach and singularity analysis. The generating functions are composed of nested square roots and exhibit unexpected phenomena in some of the cases.

主講人：Emma Yu Jin (Technical University of Vienna)

講題：Scaling limits of random  $P$ -trees

時間：106年2月21日(星期二) 下午 2:20 –3:05

### Abstract

A  $P$ -tree is a rooted unlabeled tree considered up to symmetry. In 2015 Panagiotou and Stufler proved one important fact on their way to establish the scaling limit of random  $P$ -trees: a uniform random  $P$ -tree of size  $n$  consists of a conditioned Galton-Watson tree  $C_n$  and many small forests, where with probability tending to one as  $n$  tends to infinity, any forest  $F_n(v)$ , that is attached to a node  $v$  in  $C_n$ , is maximally of size  $|F_n(v)| = O(\log n)$ . Their proof used the framework of a Boltzmann sampler and deviation inequalities.

In this talk, first I will review the enumeration and asymptotic estimation for the number of  $P$ -trees. Second I present our main results on random  $P$ -trees. The first one is an improvement on the bound  $|F_n(v)|$ , namely we prove  $|F_n(v)| = \Theta(\log n)$  by employing a unified framework in analytic combinatorics. The second one is a combinatorial interpretation of the rational weights of these forests and the defining substitution process in terms of automorphisms associated to a given  $P$ -tree. The third one is the limit probability that for a random node  $v$ , the attached forest  $F_n(v)$  is of a given size.

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茶會：當天下午 3:10 (科學一館 205 室)

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