ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Enumeration of lattice paths with forbidden patterns

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ABSTRACT

A lattice path is a word $(a_1, ..., a_n)$ over an alphabet S, a pre-chosen set of integer numbers. It is visualized as a polygonal line which starts at the origin and consists of the vectors $(1, a_i)$, $i = 1, \dots, n$, appended to each other.

In 2002, Banderier and Flajolet found general expressions for generating functions that enumerate several classes of lattice paths ("walks", "bridges", "meanders", and "excursions").

We extend and refine the study of Banderier and Flajolet by considering lattice paths that avoid a "pattern" – a fixed word p. We obtain expressions that generalize those from the work by Banderier and Flajolet.

Our main tool is a combination of finite automata machinery with a novel multidimensional extension of the so-called kernel method. Via the link between lattice paths and pushdown automata, this method can be generally applied to enumeration of formal languages generated by context-free grammars. (Joint work with A. Bacher, C. Banderier and B. Gittenberger)

We hope to see you there!