Combinatorial descriptions of products in the category of forests and open order-preserving maps

Pietro Codara

(joint work with Ottavio M. D'Antona, and Vincenzo Marra)

Dipartimento di Informatica
Università degli Studi di Milano, Italy
`codara@di.unimi.it`

In [1], the authors introduce a technique to compute finite coproducts of finite Gödel algebras, *i.e.* Heyting algebras satisfying the prelinearity axiom $(\alpha \to \beta) \vee (\beta \to \alpha)$. To do so, they investigate the product in the category opposite to finite Gödel algebras: the category of forests and open order-preserving maps. (A forest is a partially ordered set F such that, for every $x \in F$, the downset of x is a chain, when endowed with the order inherited from F). To achieve their result, the authors make use of ordered partitions of finite sets and of a specific operation – called *merged-shuffle* – on ordered partitions.

In this talk, besides recalling the aforementioned construction of the product, we show that, from an enumerative point of view, such a product can be simply described in terms of Delannoy coefficients, of bipartite graphs, and of product of matrices.

Bibliography

[1] D'ANTONA, OTTAVIO M. AND MARRA, VINCENZO: Computing coproducts of finitely presented Gödel algebras, *Ann. Pure Appl. Logic*, **142** (2006), 202–211.