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Abstracts of Short Communications and Posters

Section:

13. Combinatorics

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New results in the enumeration of rhombus tilings
A classical result of MacMahon gives the enumeration of all plane partitions inside an $a \times b \times c$ box. A simple bijection shows that this also gives the number of all rhombus tilings of a hexagon with sides a, b, c, a, b, c. Jim Propp proposed to investigate this sort of enumeration further. One of the questions he asked was how many such rhombus tilings would contain a particular fixed rhombus. In the talk, I will show how to solve some of these problems, by evaluating certain determinants. The ingredients in the proofs are, among others, a factorization theorem for perfect matchings, Bernoulli numbers, continued fractions, orthogonal polynomials, and, in particular, continuous Hahn polynomials. These results are joint with Mihai Ciucu and Markus Fulmek.