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Colloquium

Ilse Fischer / University of Vienna

Where are the bijections? Plane Partitions and Alternating Sign Matrices

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Erwin Schrödinger Institute

Abstract



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For about 35 years now, combinatorialists have failed to find bijections between three classes of objects that are all counted by the product formula $\prod_{i=0}^{n-1} \frac{(3i+1)!}{(n+i)!}$. These objects are $n \times n$ alternating sign matrices, totally symmetric self-complementary plane partitions in a $2n \times 2n \times 2n$ box, and cyclically symmetric rhombus tilings of a hexagon of side lengths $n+2, n, n+2, n, n+2, n$ with a central hole of size 2. Recently, we have added a fourth class of objects to this list, namely alternating sign triangles, and, even more recently, we have extended this class to alternating sign trapezoids, and have shown that they are equinumerous with cyclically symmetric rhombus tilings of a hexagon with a central hole of size k .

In my talk, I shall tell the fascinating story of this (so far) unsuccessful search for explicit bijections. Joint work with Arvind Ayyer and Roger Behrend.

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