

# Combinatorial properties of triangular partitions

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A triangular partition is a partition whose Ferrers diagram can be separated from its complement (as a subset of  $\mathbb{N}^2$ ) by a straight line. Having their origins in combinatorial number theory and computer vision, triangular partitions have been studied from a combinatorial perspective by Onn and Sturmfels, by Corteel et al., and by Bergeron and Mazin.

We consider enumerative, geometric and algorithmic properties of such partitions. Specifically, we give a new characterization of triangular partitions and the cells that can be added or removed (while preserving the triangular condition), and we study the poset of triangular partitions ordered by containment of their diagrams. Finally, using an encoding via balanced words, we give an efficient algorithm to generate all the triangular partitions of a given size, and a formula for the number of triangular partitions whose Young diagram fits inside a square.