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Higher Dimensional Floorplans and Baxter d-permutations

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A 2-dimensional mosaic floorplan is a partition of a rectangle by other rectangles with no empty rooms. These partitions (considered up to some deformations) are known to be in bijection with Baxter permutations. A d-permutation is a $(d-1)$-tuple of permutations. Recently, in N. Bonichon and P.-J. Morel, J. Integer Sequences 25 (2022), Baxter d-permutations generalising the usual Baxter permutations were introduced.

In this talk, I will introduce the d-floorplans which generalise the mosaic floorplans to arbitrary dimensions. Then, I will present the construction of their generating tree. The corresponding labels and rewriting rules appear to be significantly more involved in higher dimensions. Finally, I will present a bijection between the 2^{d-1}-floorplans and d-permutations characterised by forbidden vincular patterns. Surprisingly, this set of d-permutations is strictly contained within the set of Baxter d-permutations.

This is a joint work with Nicolas Bonichon and Adrian Tanasa (Université de bordeaux), this talk is based on arXiv:2504.01116.

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