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Tatami Tilings of Rectangles

This talk is concerned with tilings of rectangular grids with tiles of two sizes, 1×2 tiles (dimers) and 1×1 tiles (monomers). The tiles must partition the rectangle and satisfy the constraint that no four corners of the tiles meet; such tilings are called tatami tilings. We provide a structural characterization of tatami tilings and use it to prove that the tiling is completely determined by the tiles that are on its border. We show various enumerative results; for example, that the number of tatami tilings of an $n \times n$ square with n monomers is $n2^{n-1}$. We also show that, for fixed-height, the generating function for the number of tatami tilings of a rectangle is a rational, and outline an algorithm that produces the generating function.

This is joint work with Alejandro Erickson, Mark Schurch, and Jenni Woodcock.