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DISKRETE MATHEMATIK UND ALGEBRA – TU ILMENAU

Fully Packed Loop configurations on squares and triangles

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Fully Packed Loop configurations (FPLs) are subgraphs of the square grid such that each internal node is of degree two. While these objects arise naturally in a statistical physics context as a model for ice, they also lead to intriguing enumeration problems. I will start by giving a survey on FPLs of square shape, including Wieland's gyration, the Razumov-Stroganov (ex-)Conjecture and a connection to rhombus tilings. Fully Packed Loop configurations of triangular shape (TFPLs) first appeared in the study of FPLs on a square where they were used to show that the number of FPLs with a given link pattern that has m nested arches is a polynomial function in m. It soon turned out that TFPLs possess a number of other nice properties. For instance, we will see how a curious inequality involving the boundary condition of TFPLs led to the discovery that TFPLs can be seen as a generalized model for Littlewood-Richardson coefficients, thereby establishing an unexpected link to algebra. Moreover, it will be discussed why this could be the starting point for a new approach towards the enumeration of TFPLs.