Two non-holonomic lattice walks in the quarter plane

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Abstract

We present two classes of random walks restricted to the quarter plane whose generating function is not holonomic. The non-holonomy is established using the iterated kernel method, a variant of the kernel method recently introduced in work on walks in wedges (Janse van Renseberg *et al*, preprint) These results add evidence to a recent conjecture about the holonomy of generating functions of walks in the quarter plane. We will also give an asymptotic expression for the number of walks of a given length, and discuss general characteristics of combinatorial objects with non-holonomic generating functions.

This is work done in collaboration with Andrew Rechnitzer.