# Walks in the quarter plane with multiple steps

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We extend the classification of nearest neighbour walks in the quarter plane to models in which multiplicities are attached to each direction in the step set. Our study leads to a small number of infinite families that completely characterize all the models whose associated group has order 4, 6, or 8. All these models have D-finite generating functions. We also discovered some new models with a group of order 10, whose generating function seems to be algebraic. According to our investigations, it remains true (and mysterious) that a model has a D-finite generating function if and only if its associated group is finite. This work has been accepted for publication at this year's conference on Formal Power Series and Algebraic Combinatorics (FPSAC). See [1] for a preprint.

## References

[1] M. Kauers and R. Yatchak, *Walks in the Quarter Plane with Multiple Steps*, ArXiv 1411.3537, November 2014.