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*Occurrences of exactly solvable PDEs in combinatorial problems*

When applying generating functions techniques various combinatorial enumeration problems can be reformulated as searching for solutions of certain quasilinear first order partial differential equations. The general solution technique “method of characteristics” transforms such PDEs into ODEs after discovering characteristic curves, but the latter is not always feasible in a constructive way. However, for several interesting combinatorial questions this is indeed the case and one obtains fairly explicit generating functions solutions, which can be treated by analytic combinatorics methods. We illustrate this “observation” with a few examples related to patterns in mappings and trees, on-line decision making strategies and urn models.