Title: Combinatorial Diophantine equations and a refinement of a theorem on separated variables equations

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We look at Diophantine equations arising from equating classical counting functions such as perfect powers, binomial coefficients and Stirling numbers of the first and second kind. The proofs of the finiteness statements that we give use a variety of methods from modern number theory, such as effective and ineffective tools from Diophantine approximation. As a tool for one part of the statements we establish a theoretical result that gives a more precise description on the structure of the solution set in the theorem, due to BILU and TICHY, on Diophantine equations with separate variables in the case when infinitely many solutions exist.

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