

Termination Criteria for Zeilberger's Algorithm in Mixed Cases

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We present three criteria on the termination of Zeilberger's algorithm in mixed cases. The first is for the differential and shift case; the second for the differential and q -shift case; and the last for shift and q -shift case. The criteria describe necessary and sufficient conditions on the existence of telescopers for hyperexponential-hypergeometric solutions in the above mixed case.

We will also review some results on which the criteria are based, including: a structure theorem on compatible rational functions, and various generalizations of Hermite reduction in the mixed cases.

This talk reports joint work with S. Chen, F. Chyzak, R. Feng and G. Fu.