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Algorithms for q-hypergeometric summation in computer algebra. (English)
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The paper describes (theory and implementation in Maple) three algorithms for q-hypergeometric summation. The first one is a multibasic analogue of Gosper's algorithm. The second is a q-Zeilberger type algorithm. The third one is designed to find q-hypergeometric solutions of linear recurrences. Applications to q-analogous of classical orthogonal polynomials are also presented. For example the connection coefficients between families of q-Askey-Wilson polynomials are computed. The Maple package is the first one which combines all the algorithms which are useful tools to deal with problems associated with q-hypergeometric series.

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Keywords : hypergeometric solutions of linear recurrence; q-series; Gosper and Zeilberger algorithms; Maple; q-Askey-Wilson polynomials; q-hypergeometric series

Classification:

- 65D20 Computation of special functions
- 33D45 Basic hypergeometric functions and integrals in several variables
- 68W30 Symbolic computation and algebraic computation
- 33F10 Symbolic computation of special functions
- 33D15 Basic hypergeometric functions of one variable