



# RISC

Research Institute for Symbolic Computation

## fastZeil: The Paule/Schorn Implementation of Gosper's and Zeilberger's Algorithms

This package is part of the RISCErgoSum bundle. See [Download and Installation](#).

### Short Description

With *Gosper's algorithm* you can find closed forms for indefinite hypergeometric sums. If you do not succeed, then you may use *Zeilberger's algorithm* to come up with a recurrence relation for that sum. Both algorithms may be used to find and prove identities involving hypergeometric terms and sums of those.

### Authors

- [Peter Paule](#)
- Markus Schorn

### Accompanying Files ¶

- [readme.nb](#)

### Literature

To use the implementation it is sufficient to study the notebook `readme.nb`. It contains a few examples to start with.

You find some easy and several more involved examples for using the implementation in our joint paper

- P. Paule and M. Schorn, **A Mathematica Version of Zeilberger's Algorithm for Proving Binomial Coefficient Identities**, J. Symbolic Comput., 20 (1995), 673-698.

[\[pdf\]](#)

The diploma thesis of Markus Schorn makes sure that the algorithm is indeed correct. Our implementation is closely related to the detailed background developed there. And again it contains several interesting examples.

- M. Schorn, **Contributions to Symbolic Summation**, Diploma Thesis, RISC, J. Kepler University, Linz, December 1995. [\[pdf\]](#)

Methods for tuning the algorithm are described in the paper

- A. Riese, **Fine-Tuning Zeilberger's Algorithm: The Methods of Automatic Filtering and Creative Substituting**, in Symbolic Computation, Number Theory, Special Functions, Physics and Combinatorics (F.G. Garvan and M.E.H. Ismail, eds.), Developments in Mathematics, Vol. 4, pp. 243-254, Kluwer, 2001. [\[pdf\]](#)

Finally, in the book  **$A = B$**  by M. Petkovsek, H. Wilf, and D. Zeilberger you find a collection of methods to automatically prove identities.