

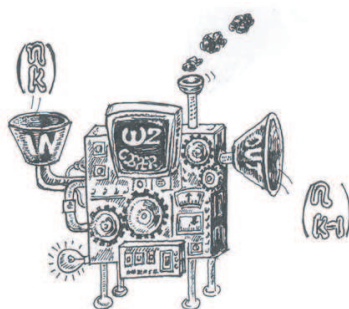
# Combinatorial Identities Research Group

## Research Group Members:

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**Project Title:** Hypergeometric Summation and Combinatorial Identities



## Abstract:

Algorithms of Gosper, Zeilberger and Wilf-Zeilberger (WZ) are used extensively in modern computer algebra software. These algorithms and computerized proof techniques of WZ can be used for proving, evaluating and discovering identities involving hypergeometric terms automatically by computer. The problem of finding closed-form expressions for various sums is among ancient and attractive mathematical problems. Summations involving hypergeometric terms appear most often in Combinatorics and most of them are very hard and/or tedious to evaluate and prove by hand. Algorithms of Gosper and Zeilberger have greatly contributed in handling the evaluations of such sums and proving identities involving combinatorial objects.

This research group will:

- study algorithms of Gosper and Zeilberger, along with computerized proof techniques of Wilf-Zeilberger and counting (combinatorial) proof techniques.
- explore, conjecture and formulate formulas for summation expressions,
- prove identities involving binomial coefficients using computerized prove techniques and
- give beautiful and elegant combinatorial proofs for challenging and interesting old and new identities.

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