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Recent developments in rational summation

The talk discusses recent algorithmic developments for the problem of rational summation: Given a univariate rational function $g(x)$, determine whether there exists a rational antidifference $f(x)$, such that $f(x+1) - f(x) = g(x)$, and the more general problem of extracting a maximal rationally summable part from $g(x)$. The emphasis is on improving the efficiency of rational summation algorithms. The techniques used are modular methods and shiftless decomposition: Modular methods lead to faster algorithms for all inputs. Shiftless decomposition reduces the number of worst case inputs with exponential running time behaviour.

This is joint work with Mark Giesbrecht, Arne Storjohann, and Eugene Zima.