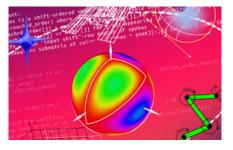
Computer Algebra for Functional Equations in Combinatorics and Physics



ID de Contribution: 26

Type: Non spécifié

Submodule approach to creative telescoping by Mark van Hoeij

mardi 5 décembre 2023 16:30 (1 heure)

Abstract. This talk proposes ideas to speed up the process of creative telescoping, particularly when the telescoper is reducible. One can interpret telescoping as computing an annihilator L in D for an element H in a D-module M. The main idea is to look for submodules of M. For a non-trivial submodule N, constructing the minimal operator R of the image of H in M/N gives a right-factor of L in D. Then L = L'R where L' is the telescoper of R(H). To expedite computing L', compute the action of D on a natural basis of N, then obtain the telescoper L' for R(H) with a cyclic vector computation. The next main idea is that when N has automorphisms, use them to construct submodules N_1, \ldots, N_k . Then $L' = \text{LCLM}(L_1, \ldots, L_k)$ where L_i is the telescoper of the projection of R(H) on N_i . An LCLM can greatly increase the degrees of the coefficients, so L' and hence L can be much larger than the factors L_1, \ldots, L_k and R. Examples show that computing each factor L_i and R separately can save a lot of CPU time compared to computing the full telescoper L all at once with standard creative telescoping.