IMPLEMENTATION OF THE DIFFERENTIAL INVOLUTIVE ALGORITHMS IN THE CAS MAPLE VR5

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Involutive bases are Groebner bases, though, generally redundant, and involutive methods provide an alternative approach to computation of Groebner bases. Using involutive basis, one can easily obtain, for example, dimensional polynomial of the system. Involutive bases may be used in the Lie symmetries analysis of the differential systems. In the paper [1] generalization of the involutive basis definition for differential system was given. Then, in the recent work of Prof. V. Gerdt [3] an algorithm for construction of the minimal differential involutive Groebner basis for system of the linear differential equations was introduced. The main goal of my work was to implement this algorithm in the CAS Maple. Some of the optimizations, described in the [3, 4, 5], were implemented too. The next step was to perform comparison with the *diffalg* package. My implementation was used in computing of the primitive element in the differential module for some systems of linear differential equations and computing of the differential dimensional polynomials. Unfortunately, Maple is not very effective system, and we can't use it for computing of the really interesting examples. But we can analyze and use results in the implementation on the more low-level language, such as C++. It seems, that correct implementation of the involutive algorithms may be much more faster, then any implementation of the classic Buchberger algorithm.

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