

Abstract

We generalize the concept of r -standard bases also to any ordering. We develop a theory and algorithms of border basis and Janet bases for non-well orderings in a general setting, analyze modular and parallel algorithms to compute them. We give modular and parallel implementation of r -standard bases in SINGULAR and compare the results with other implementations. We also compare our implementation of Janet bases with the implementation in SINGULAR based on the algorithm of V. Gerdt (cf. [Ger05]). We prove the corresponding verification theorem for the modular approach.

We develop a theory, algorithms and implementations to compute sagbi bases for local orderings in a parallel and modular setting. Especially a corresponding verification theorem has been proved.

We give an algorithm to compute standard bases of an infinite dimensional vector space given by the sum of two modules over different rings. We also explain how these standard bases can be computed using modular methods.