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Computing the conductor of an integral extension. (English) Zbl 0755.13012

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Summary: We describe algorithms to solve different problems in commutative algebra. These algorithms are linked by the fact that they are useful in considering integral extensions (integral closure, weak integral closure, etc.).

The first algorithm computes the conductor of an extension of rings. The algorithm is based on the computation of the inverse image of a submodule relative to a module homomorphism. This problem is solved lifting suitably to free modules over polynomial rings. To complete the computation of the conductor one has to represent an integral extension as a finitely presented module; we give an algorithm for this, that at the same time verifies that the extension is integral. — Other algorithms are given that test subring inclusion and birational equivalence. These algorithms are not strictly necessary to perform the conductor computation, but are in some sense connected to the former problem, since if the answer to these tests is negative then the conductor is trivial.

MSC:

13P99 Computational aspects and applications of commutative rings
13B02 Extension theory of commutative rings
13B22 Integral closure of commutative rings and ideals

Keywords:

integral closure; conductor of an extension of rings; subring inclusion; birational equivalence

Full Text: DOI

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