NONCOMMUTATIVE GRÖBNER BASIS AND EXT GROUPS

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Abstract:

The Gröbner basis is a powerful tool in commutative algebra. We can use it to do many calculations such as computing the presentations of the kernel and cokernel of a map between finitely presented modules over a commutative algebra. However, many important algebras including the Steenrod algebra in algebraic topology are not commutative. We make a noncommutative generalization of the Gröbner basis which can be applied to the Steenrod algebra A. This leads to highly efficient calculations in the category of A-modules including the computation of E2 pages of Adams spectral sequences.