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Christopher Hillar and **Seth Sullivant*** (smsulli2@ncsu.edu). *Finite Gröbner bases in infinite dimensional polynomial rings and applications.*

We introduce the theory of monoidal Gröbner bases, a concept which generalizes the familiar notion in a polynomial ring and allows for a description of Gröbner bases of ideals that are stable under the action of a monoid. The main motivation for developing this theory is to prove finiteness theorems in commutative algebra and its applications. A major result of this type is that ideals in infinitely many indeterminates stable under the action of the symmetric group are finitely generated up to symmetry. We use this machinery to give new proofs of some classical finiteness theorems in algebraic statistics as well as a proof of the independent set conjecture of Hosten and the second author. (Received January 13, 2010)