SOME COMMUTATIVITY THEOREMS FOR RINGS WITH POLYNOMIAL CONSTRAINTS

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Abstract

Let $m > 1, r, s$ be fixed non-negative integers, and let R be a ring with unity 1 in which for every x in R there exist polynomials $f(X), p(X), q(X) \in \mathbb{Z}[X]$, depending on x, such that $p(x)[f(x), y]q(x) = x^r[x, y^m]y^s$, for all y in R. The main result of the present paper asserts that R is commutative if R has the property $Q(m)$ (viz. for all x, y in R, $m[x, y] = 0$ implies that $[x, y] = 0$). Commutativity of R has also been obtained under different sets of constraints on integral exponents. Thus, many well-known commutativity theorems become corollaries of our results.