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Ore extensions satisfying a polynomial identity. (English summary)
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In 1977, G. Cauchon ["Les t-anneaux et les anneaux à identités polynomiales noethériens", thèse, Univ. Paris XI, Orsay, 1977] characterized when an Ore extension $R[x,\sigma,\delta]$ is PI for R simple and σ an automorphism of R, and, eleven years afterwards, J.-L. Pascaud and J. Valette [Comm. Algebra **16** (1988), no. 11, 2415–2425; MR0962321 (89k:16006)] showed that an Ore extension $R[x,\sigma]$ is PI (for R a semiprime ring and σ an automorphism of R) if and only if σ is of finite order over the center of R. In this paper the authors study when an Ore extension $R[x,\sigma,\delta]$ is PI, where R is semiprime and σ is only an injective endomorphism of R.

In a preliminary case, the authors study the problem of determining when R is prime and PI (in this case R is left and right Goldie) and show, in particular, that an Ore extension $R[x,\sigma,\delta]$ is PI if and only if the center of $R[x,\sigma,\delta]$ is nontrivial, if and only if $Q(R)[x,\sigma,\delta]$ is PI (where $Q(R)$ denotes the classical ring of quotients of R), if and only if σ is an automorphism of finite inner order in $Q(R)$ and δ is an algebraic σ-derivation of $Q(R)$.

Finally, they study the general problem and get that an Ore extension $R[x,\sigma,\delta]$ is PI for R a semiprime PI ring with ACC on annihilators (again R is left and right Goldie) and σ an injective endomorphism of R if and only if $R[x,\sigma,\delta]$ contains a nonconstant polynomial with a regular leading coefficient.

The last section studies this problem for Ore extensions over Noetherian rings.

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