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On general theory of skew polynomial rings

Our purpose is to study a monoid algebra over a non-commutative ring. First, we introduce axiomatically a family of mappings $\sigma = (\sigma_{x,y})$ defined on a ring A and subscripted with elements of a multiplicative monoid G. The assigned properties allow to call these mappings derivations of the ring A. Next, we construct a monoid algebra $A < G >$ by means of the family σ. Namely, such an algebra is our main object of study. In particular, we prove the universality property of it. We study in detail the particular case of a monoid G generated by two elements. This case is important especially for the theory of skew-polynomial, in one variable. The obtained results concerning this special case extend and generalize some related results of T. H. M. Smits. In this respect we cite [1] and also [2].

[1] Smits T. H. M. Skew polynomial rings. // Indag. Math. 30 (1968), 209-224.

[2] Cohn P. M. Free rings and their relation. — Acad. Press, London, New-York, 1971.