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On Mappings between Algebraic Systems, II

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In the previous paper [1], we have defined the $\boldsymbol{P}$-mappings*) and the $\boldsymbol{P}$-product systems*), and shown that the algebraic Taylor's expansion theorem*) holds between the $\boldsymbol{P}$-mappings and the $\boldsymbol{P}$-product systems. And some fundamental results with respect to $\boldsymbol{P}$-mappings have been derived from this theorem.

The present paper is the continuation of the paper [1]. In the section 1 of this paper, we shall introduce the concept of the B_W-conjugate relation between families $\boldsymbol{P}$ and $\boldsymbol{Q}$ of basic mapping-formulas*), and it is a relation between $\boldsymbol{P}$-mappings and $\boldsymbol{Q}$-mappings. And, by using the algebraic Taylor's expansion theorem, we shall show that this relation is equivalent to the existence of some inner isomorphic mapping between the $\boldsymbol{P}$-product system $\boldsymbol{P}(\mathfrak{B})$ and the $\boldsymbol{Q}$-product system $\boldsymbol{Q}(\mathfrak{B})$ for every B_W-algebraic system $\mathfrak{B}$. In the section 2, we shall define the derivations between primitive algebraic systems, by using the concepts of the (A_V, B_W)-universality*) and the B_W-conjugate relation. And we shall show that one of these derivations is the usual one in the case of the commutative algebras over a field of characteristic 0. Thus the derivations can be considered as the mappings which are some natural algebraic generalization of homomorphisms.

§ 1. Some relations between families of basic mapping-formulas.

Let R be a set of relations of the form

$$b_1 = F_1(a_1, \cdots, a_m), \cdots, b_n = F_n(a_1, \cdots, a_m)$$

on a free ϕ_W-algebraic system $F(\{a_1, \cdots, a_m, b_1, \cdots, b_n\}, \phi_W)$. And let B_W be a system of composition-identities with respect to W. If there exists a set S of relations of the form

$$a_1 = F_1^*(b_1, \cdots, b_n), \cdots, a_m = F_m^*(b_1, \cdots, b_n)$$

such that

*) Cf. [1].