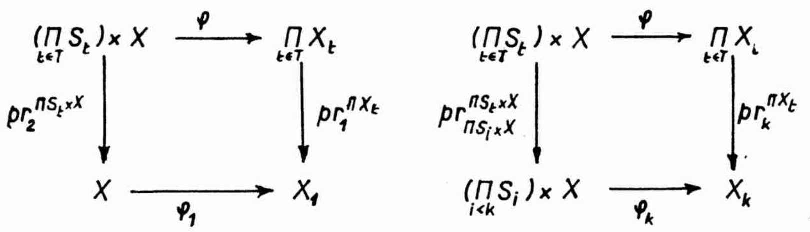
The automaton $gA_t = (X, \prod_{t\in T} S_t, \prod_{t\in T} Y_t, \delta, \lambda)$, where δ, λ are defined in diagram (7), is called the *g-product of the family $(A_t)_{t\in T}$ with the connecting morphism φ*. In the case when K = Set, the g-product is the generalized product considered in [4].

There exist q-morphisms $p^k : gA_t \to A_k$, $k \in T$, from the g-product to each of its components. In fact, p^k may be defined by $p^k = (\mathrm{pr}_k^{\Pi X_t} . \varphi, \mathrm{pr}_k^{\Pi S_t}, \mathrm{pr}_k^{\Pi Y_t})$.

Now we shall assume that $\otimes$ is the categorical product $\times$. In this case we can show a relation between c-products and g-products (cf. [4] for the case when K = Set).

The g-product gA_t of the family $(A_t)_{t\in T}$ with the connecting morphism φ is called *g-α_0-product* if there exists a family of morphisms $(\varphi_k : (\prod_{i<k} S_i) \otimes X \to X_k)_{k\in T}$ such that the diagrams



$k \in T$, $k \geqq 2$, are commutative.

It may be shown that the c-product of a family of automata in K with $\eta = \eta' . \mathrm{pr}_2^{\Pi S_t \times X}$, where $\eta' : X \to X_1$ is a morphism of K, is a g-α_0-product.

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