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**Zbl 1103.08003****Petković, T.; Ćirić, M.; Bogdanović, S.****On correspondences between unary algebras, automata, semigroups and congruences.** (English)

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An automaton can be considered as a unary algebra whose signature consists of the functions induced by the letters of the alphabet. In this paper the authors study pseudovarieties of unary algebras (classes of finite algebras closed under subalgebras, homomorphic images, and finite direct products) and their relations to pseudovarieties of semigroups and of (finite indexed) congruences. For a class  $\mathfrak{S}$  of semigroups let  $\{\Lambda_{\mathfrak{S}}(X)\}$ , where  $X$  ranges over finite alphabets, be the family of unary algebras whose transition semigroups are in  $\mathfrak{S}$ . The authors give necessary and sufficient conditions for a family  $\{\Lambda(X)\}$  of finite unary algebra to be of the form  $\Lambda_{\mathfrak{S}}$  for some pseudovariety of semigroups  $\mathfrak{S}$ : the class  $\Lambda$  must be a pseudovariety of unary algebras that satisfies the following conditions:

- (1) for any two finite unary algebras  $A, B$  which have isomorphic transition semigroups,  $A \in \Lambda(X) \iff B \in \Lambda(X)$  holds for any  $X$ , and
- (2) for any surjection  $\alpha : X \rightarrow Y$  and any finite unary  $X$ -algebra  $A$ , if  $A^\alpha$  is the  $Y$ -algebra induced by  $\alpha$ , then  $A \in \Lambda(X) \iff A^\alpha \in \Lambda(Y)$ .

It is also proved that the pseudovarieties of unary algebras that satisfy (1) and (2) correspond to families of finite indexed congruences that are isomorphically closed principal filters and in which a congruence-variant of condition (2) above is true.

*Saeed Salehí (Zanjan)**Keywords* : unary algebras; automata; varieties; pseudovarieties; regular identities*Classification* :

- \*08A60 Unary algebras
- 08A30 Subalgebras of general algebraic systems
- 08B99 Varieties of algebras
- 20M07 Varieties of semigroups
- 68Q70 Algebraic theory of automata