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INSTITUTE FOR ADVANCED STUDY AND
UNIVERSITY OF MINNESOTA

REPORT ON ATTAINABILITY OF SYSTEMS OF IDENTITIES

BY T. TAMURA

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1. Introduction. This note is to report the main results in the paper, *Attainability of systems of identities on semigroups*, which will be published elsewhere with detailed proof.

Let f and g be words, i.e., finite sequences of letters. By an identity we mean an equality $f=g$ of two words f and g. Let $\mathfrak{I}$ be a system of identities T_λ,

$$\mathfrak{I} = \{T_\lambda; \lambda \in \Lambda\} \quad \text{where } T_\lambda \text{ is "} f_\lambda = g_\lambda, \text{"}$$

for example, $\{xyz=xzy,\ x=x^2\}$, $\{xy=yx,\ x=x^2\}$ and so on.

Let S be a semigroup. For a fixed S and a fixed $\mathfrak{I}$, consider the set $\mathfrak{C}$ of all congruences ρ on S such that S/ρ satisfies $\mathfrak{I}$, in other words, $\mathfrak{I}$ identically holds if all letters are replaced by elements of S/ρ. There is the smallest element ρ_0 in $\mathfrak{C}$ in the sense that $\rho_0 \subseteq \rho$ for all $\rho \in \mathfrak{C}$ [1], [4], [7], [8], [9], [11]. Then ρ_0 is called the smallest $\mathfrak{I}$-congruence, and the partition of S due to ρ_0 is called the greatest $\mathfrak{I}$-decomposition. Of course, such a decomposition of S is unique. If the cardinal number $|S/\rho_0|$ of S/ρ_0 is greater than 1, then S is called $\mathfrak{I}$-decomposable; if $|S/\rho_0|=1$, then S is $\mathfrak{I}$-indecomposable. In particular, if $\mathfrak{I}$ is a semilattice, that is, $\mathfrak{I}=\{x=x^2,\ xy=yx\}$, then ρ_0 is called the smallest semilattice-congruence or, simply, s-congruence. The author proved in his papers [8], [10] the following theorem, and also Petrich recently proved the equivalent statement [6].