

Meeting: 999, Nashville, Tennessee, SS 13A, Special Session on Semigroup Theory

999-20-47

Jorge Almeida, Department of Mathematics, University of Porto, Porto, Portugal, **Stuart W. Margolis*** (margolis@math.biu.ac.il), Department of Mathematics, Bar-Ilan University, 52900 Ramat Gan, Israel, **Benjamin Steinberg**, Department of Mathematics, Carleton University, Ottawa, Ontario Canada, and **Mikhail V. Volkov**, Department of Mathematics, University of the Urals, Ekaterinberg, Russia. *Representation Theory of Finite Semigroups and Formal Language Theory.*

Representation theory is one of the oldest areas of finite semigroup theory. The connection between finite semigroups and formal language theory following the work of Rhodes, Schutzenberger and others in the 1960's has been the major focus of research in finite semigroups for more than 40 years. Except for some work of Rhodes in the 1960's there has not been much contact between the two fields.

We compute the restriction of the Jacobson Radical from KS to S for any finite semigroup S and any field K . Rhodes proved that over a field of characteristic 0, this is the largest congruence whose idempotent classes are locally trivial and we show that in characteristic p it is the largest congruence whose idempotent classes are locally p -groups.

We characterize the semigroups that are triangularizable or unitriangularizable over a finite field K . We show that this collection is a pseudovariety and give a finite pseudoidentity base as well as a structural characterization. Then we show that the language theoretic operation of counting subwords over a field, that was studied by Pin, Schutzenberger, Weil and others can be computed by the irreducible representations of a finite semigroup. Much of this work was inspired by results of Okninski on more general classes of semigroups. (Received July 23, 2004)