Title: Mobius functions and semigroup representation theory

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Abstract: Using Rota's theory of Mobius inversion, we are able to make very explicit the work of Munn and Ponizovskii on representations of inverse semigroups. In particular, one can obtain a formula for multiplicities of representations using only knowledge of the characters of maximal subgroups and the Mobius function of the idempotent semilattice. Since most important inverse monoids, such as Renner monoids of algebraic monoids, have Eulerian semilattices, this leads to relatively simple formulas.

The results for inverse semigroups can be made to work for other classes of semigroups including semigroups of upper triangular matrices over a field. This leads to applications in computing spectra of random walks on such semigroups.