

Monomorphisms in categories of acts over semigroups

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In this talk we consider acts over semigroups. If S is a semigroup, we say that a right S -act A_S is *firm* if the mapping $A \otimes S \rightarrow A$, $a \otimes s \mapsto as$ is bijective. A semigroup S is called *firm* if the act S_S is firm. Every monoid is a firm semigroup, but the converse is not true.

It turns out that in the category of firm acts over a firm semigroup monomorphisms coincide with regular monomorphisms, but a monomorphism may be non-injective. We give some alternative descriptions of monomorphisms in such a category. We also exhibit some conditions on a semigroup which guarantee that all monomorphisms in this category are injective.

One can consider categorical subobjects of firm acts defined as certain equivalence classes of monomorphisms. If S is a firm semigroup then such subobjects form a lattice which turns out to be distributive.

This talk is based on joint research with Ülo Reimaa.