On perfectness of dimonoid variety

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A nonempty set D with two binary associative operations $\dashv$ and $\vdash$ is called a *dimonoid* [1] if for all $x, y, z \in D$ the following conditions hold:

$$(x\dashv y)\dashv z = x\dashv(y\vdash z),$$
$$(x\vdash y)\dashv z = x\vdash(y\dashv z),$$
$$(x\dashv y)\vdash z = x\vdash(y\vdash z).$$

The free dimonoid of an arbitrary rank was constructed by J.-L. Loday in [1].

Let Θ be a variety of algebras and Θ^0 the category of all free in Θ algebras $W(X)$, where X is a finite set. The problem is to describe the automorphism group $Aut(\Theta^0)$ for a given Θ [2]. There are many papers devoted to studying the mentioned problem in the varieties of groups, semigroups, monoids, modules and semimodules, associative algebras, Lie algebras and other structures (see, e.g., [3, 4]).

A variety Θ is called *perfect* (*almost perfect*) if the outer automorphism group of the category Θ^0 is trivial (finite). For example, the variety of groups is perfect. In this talk we will study the perfectness property for the variety of dimonoids.

This work was supported by the Austrian Science Fund (FWF): P33878.

References

[1] J.-L. Loday, Dialgebras, in: Dialgebras and related operads, *Lect. Notes Math.* 1763, Springer-Verlag, Berlin, 2001, 7–66.

[2] B. I. Plotkin, Problems in algebra inspired by universal algebraic geometry, *Journal Math. Sciences (New York)* 139, 2006, no. 4, 6780–6791.

[3] E. Formanek, A question of B. Plotkin about the semigroup of endomorphisms of a free group, *Proc. Am. Math. Soc.* 2001, no. 130, 935–937.

[4] Yu.V. Zhuchok, Automorphisms of the endomorphism semigroup of a free commutative dimonoid, *Commun. Algebra* 45, 2017, no. 9, 3861–3871.