band congruence, the least left zero congruence and the least right zero congruence on the free trioid were presented. In this work we continue to study the structural properties of free trioids.

References

1. J.-L. Loday, M.O. Ronco, *Trialgebras and families of polytopes.* Contemp. Math. **346** (2004), 369–398.
2. A.V. Zhuchok, *Trioids.* Asian-Eur. J. Math. **8** (2015), no. 4, 1550089 (23 p.).
3. Yul.V. Zhuchok, *Decompositions of free trioids.* Bulletin of Taras Shevchenko National University of Kyiv. Series: Physics and Mathematics **4** (2014), 28–34.

Contact information

Yuliia V. Zhuchok
Department of Algebra and System Analysis, Luhansk Taras Shevchenko National University, Starobilsk, Ukraine
Email address: yulia.mih1984@gmail.com

Key words and phrases. Trioid, free trioid

Representations of ordered doppelsemigroups

Yurii V. Zhuchok

A *doppelsemigroup* [1] is an algebraic system consisting of a nonempty set D with two binary associative operations $\dashv$ and $\vdash$ satisfying the following identities

$$(D_1) \quad (x\dashv y)\vdash z = x\dashv(y\vdash z),$$
$$(D_2) \quad (x\vdash y)\dashv z = x\vdash(y\dashv z).$$

Let $(D, \dashv, \vdash)$ be an arbitrary doppelsemigroup and let $\leq$ be a partial order relation on D. The algebraic system $(D, \dashv, \vdash, \leq)$ is called an *ordered doppelsemigroup* [2] if the order relation $\leq$ is stable with respect to both operations $\dashv$ and $\vdash$.

In [2] it was proved that any ordered doppelsemigroup can be embedded to a suitable ordered doppelsemigroup consisiting of binary relations. Here we construct new ordered doppelsemigroups and study other representations of ordered doppelsemigroups.

References

1. A.V. Zhuchok, *Free products of doppelsemigroups*, Algebra Univers. **77** (2017), no. 3, 361–374. DOI:10.1007/s10469-011-0431-6.
2. Yu. Zhuchok, J. Koppitz, *Representations of ordered doppelsemigroups by binary relations*, Algebra Discrete Math. **27** (2019), no. 1, 144–154.

Contact information

Yurii V. Zhuchok
Department of Algebra and System Analysis, Luhansk Taras Shevchenko University, Starobilsk, Ukraine
Email address: zhuchok.yu@gmail.com

Key words and phrases. Doppelsemigroup, ordered doppelsemigroup, representation