On 0-homology of categorical at zero semigroups

Lyudmyla Yu. Polyakova

The 0-cohomology and 0-homology of semigroups were introduced in [1] and [2] as a generalizations of Eilenberg-MacLane cohomology and homology. The one of possible applications of the 0-cohomology and 0-homology is the computation of classical cohomology and homology of semigroups.

It was shown in [2] that the first 0-homology group of a semigroup with zero S is isomorphic to the first homology group of semigroup $\overline{S}$, which is called 0-reflector of S. The 0-homology groups of S of greater dimensions in the general case are not isomorphic to the homology groups of $\overline{S}$.

We show that for the categorical at zero semigroups such an isomorphism can be built for all dimensions.

Definition. *A semigroup S is called categorical at zero if $xyz = 0$ implies $xy = 0$ or $yz = 0$.*

Theorem. *If S is categorical at zero then the 0-homology group $H_n^0(S, A)$ is isomorphic to the homology group $H_n(\bar{S}, A)$ for all $n \geq 0$ and every module A, which is considered as a 0-module over S in the first case and as a module over $\overline{S}$ in the second case.*

References

[1] B. V. Novikov: "On 0-cohomology of semigroups", In: *Theoretical and applied questions of differential equations and algebra*, Naukova dumka, Kiev, (1978), pp. 185–188 (in Russian).

[2] Polyakova L. Yu. On 0-homology of semigroups // Bulletin of Kyiv University, "Physics and Mathematics" series. — 2007. — N 4. — P.59–64. (in russian)

[3] Novikov B. V., Polyakova L. Yu. On 0-homology of categorical at zero semigroups // Central European J. Math. — 2009. — Vol. 7, N2. — P.165–175.

Kharkov V. N. Karazin national university
`pomilka@ukr.net`