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ON COGALOIS GROUPS OF LINE QUIVERS

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Abstract

Torsion-free covers exist for abelian groups (see [1]). The coGalois group of automorphisms comes from a torsion-free cover $\varphi : C \to A$ of an abelian group A. It is defined in [2] as the group of automorphisms $f : C \to C$ s.t. $\varphi f = \varphi$ and is denoted by $G(\varphi)$. In the motivation part, the duality relation between Galois and coGalois groups will be given. The abelian groups for which the coGalois group is trivial were characterized in [3]. The notion of coGalois group can be defined in any category where we have a covering class. The torsion-free covers exist for the category $(q_n, \mathbb{Z} - mod)$ of representations of the line quiver $q_n : \bullet \to \bullet \to ... \to \bullet$ with $n-1$ arrows and n dots (see [4]). More specifically, the objects in q_n are the representations $M_1 \xrightarrow{f_1} M_2 \xrightarrow{f_2} ... \xrightarrow{f_{n-1}} M_n$ where M_i's are $\mathbb{Z}$-modules and f_j's are linear maps. In [5], coGalois groups have been studied and characterized when they are trivial in the category $(q_2, \mathbb{Z} - mod)$. In this talk, we study the coGalois groups in the category $(q_n, \mathbb{Z} - mod)$ and give some results for cases where the coGalois group is trivial.

Keywords: coGalois group, torsion-free covers, the quiver q_n

References:

[1] Enochs, E. (1963). Torsion free covering modules. Proceedings of the American Mathematical Society, 14(6), 884-889.

[2] Enochs, E. E., Rozas, J. G., Oyonarte, L., & Jenda, O. M. (2000, March). Compact coGalois groups. In Mathematical Proceedings of the Cambridge
Philosophical Society (Vol. 128, No. 2, pp. 233-244). Cambridge University Press.

[3] Enochs, E. E., & Rada, J. (2005). Abelian groups which have trivial absolute coGalois group. Czechoslovak Mathematical Journal, 55(2), 433-437.

[4] Wesley, M. D. (2005). Torsion free covers of graded and filtered modules. University of Kentucky.

[5] Hill, P. (2008). Abelian group pairs having a trivial coGalois group.
Czechoslovak Mathematical Journal, 58, 1069-1081.