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From torsion theories to closure operators and factorization systems. (English)

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Torsion theories are extended far beyond abelian categories. For this, one needs a subcategory of “null morphisms” and gets two full subcategories, one consists of torsion objects and the other from torsion-free ones. Every morphism from a torsion object to a torsion-free object is null. It leads to a factorization system on the category of morphisms.

Reviewer: Jiří Rosický (Brno)

MSC:

18E40 Torsion theories, radicals

18A32 Factorization systems, substructures, quotient structures, congruences, amalgams

06A15 Galois correspondences, closure operators (in relation to ordered sets)

Cited in 1 Review
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Keywords:

torsion theory; closure operator; factorization system

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References:

- [1] Beck, J., Distributive laws, in: Seminar on triples and categorical homology, Lecture Notes in Math. 80 (1969), 119-140.
- [2] Borceux, F., “Handbook of Categorical Algebra” 1, Cambridge University Press, 1994. · [Zbl 0911.18001](#)
- [3] Borceux, F., “Handbook of Categorical Algebra” 2, Cambridge University Press, 1994. · [Zbl 0911.18001](#)
- [4] Bourke, J. and Garner, R., Algebraic weak factorisation systems I: Accessible AWFS, J. Pure Appl. Algebra 220 (2016), 108-147. · [Zbl 1327.18004](#)
- [5] Bourke, J. and Garner, R., Algebraic weak factorisation systems II: Categories of weak maps, J. Pure Appl. Algebra 220 (2016), 148-174. · [Zbl 1327.18005](#)
- [6] Dikranjan, D. and Tholen, W., “Categorical Structure of Closure Operators: With Applications to Topology, Algebra and Discrete Mathematics”, Mathematics and its Applications 346, Springer, 1995. · [Zbl 0853.18002](#)
- [7] Ehresmann, C., Cohomologie à valeurs dans une catégorie dominée, Extraits du Colloque de Topologie, Bruxelles 1964, in: C. Ehresmann, Oeuvres complètes et commentées, Partie III-2, 531-590, Amiens 1980.
- [8] Eilenberg, S. and Steenrod, N., “Foundations of Algebraic Topology”, Princeton University Press, 1952. · [Zbl 0047.41402](#)
- [9] Gardner, B.J., Morphic orthogonality and radicals in categories, in: Rings and radicals (Shijiazhuang, 1994), 178-206, Pitman Res. Notes Math. Ser. 346, Longman, 1996. · [Zbl 0851.18001](#)
- [10] Garner, R., Understanding the small object argument, Appl. Categ. Structures 17 (2009), 247-285. · [Zbl 1173.55009](#)
- [11] Grandis, M., A categorical approach to exactness in algebraic topology, in: Atti del V Convegno Nazionale di Topologia, Lecce-Otranto 1990, Rend. Circ. Mat. Palermo 29 (1992), 179-213. · [Zbl 0770.55013](#)
- [12] Grandis, M., On the categorical foundations of homological and homotopical algebra, Cah. Topol. Géom. Différ. Catég. 33 (1992), 135-175. · [Zbl 0814.18006](#)
- [13] Grandis, M., “Homological Algebra in Strongly Non-Abelian Settings”, World Scientific Publishing Co., Singapore, 2013. · [Zbl 1280.18002](#)
- [14] Grandis, M. and Tholen, W., Natural weak factorization systems, Arch. Math. (Brno) 42 (2006), 397-408. · [Zbl 1164.18300](#)
- [15] Grandis, M. and Janelidze, G., Márki, L., Non-pointed exactness, radicals, closure operators, J. Aust. Math. Soc. 94 (2013), 348-361. · [Zbl 1291.18002](#)
- [16] Janelidze, G. and Tholen, W., Characterization of torsion theories in general categories, Contemp. Math. 431 (2007), 249-256. · [Zbl 1128.18009](#)
- [17] Lavendhomme, R., Un plongement pleinement fidèle de la catégorie des groupes, Bull. Soc. Math. Belgique 17 (1965), 153-185. · [Zbl 0146.02602](#)

- [18] Mantovani, S., Torsion theories for crossed modules, Workshop in Category Theory and Algebraic Topology, Louvain-la-Neuve 2015, Unpublished talk.
- [19] Mitchell, B., "Theory of Categories", Academic Press, 1965. · [Zbl 0136.00604](#)
- [20] Puppe, D., Korrespondenzen in abelschen Kategorien, Math. Ann. 148 (1962), 1-30. · [Zbl 0109.25201](#)
- [21] Rosický, J. and Tholen, W., Lax factorization algebras, J. Pure Appl. Algebra 175 (2002), 355-382. · [Zbl 1013.18001](#)
- [22] Tholen, W., Factorizations, fibres and connectedness, in: Categorical Topology (Toledo, Ohio, 1983), 549-566, Sigma Ser. Pure Math. 5, Heldermann, 1984.

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