Cottrell, Thomas
A study of Penon weak n-categories. II: A multisimplicial nerve construction. (English. French summary) Zbl 1405.18006
Cah. Topol. Géom. Différ. Catég. 60, No. 1, 32-114 (2019).

There are a lot of definitions of weak n-category [*R. Street*, J. Pure Appl. Algebra 49, 283–335 (1987; Zbl 0661.18005)], [*J. C. Baez* and *J. Dolan*, Adv. Math. 135, No. 2, 145–206 (1998; Zbl 0909.18006)], [*M. A. Batanin*, Adv. Math. 136, No. 1, 39–103 (1998; Zbl 0912.18006)], [*J. Penon*, Cah. Topologie Géom. Différ. Catégoriques 40, No. 1, 31–80 (1999; Zbl 0918.18006)], [*Z. Tamsamani*, K-Theory 16, No. 1, 51–99 (1999; Zbl 0934.18008)], [*T. Leinster*, Theory Appl. Categ. 12, 73–194 (2004; Zbl 1065.18006)], [*C. Hermida* et al., J. Pure Appl. Algebra 166, No. 1–2, 83–104 (2002; Zbl 0992.18005)], [*C. Hermida* et al., J. Pure Appl. Algebra 157, No. 2–3, 247–277 (2001; Zbl 0985.18006)], [*C. Hermida* et al., J. Pure Appl. Algebra 154, No. 1–3, 221–246 (2000; Zbl 0971.18005)], [*A. Joyal*, "Disks, duality and θ-categories", preprint (1997)], which are classified into *algebraic* ones (composites and coherence cells are explicitly specified) and *non-algebraic* ones (a coherent choice of composites and constraint cells is merely required to exist). There is only a few papers concerned with comparison among these various definitions [*M. A. Batanin*, J. Pure Appl. Algebra 172, No. 1, 1–23 (2002; Zbl 1003.18010)], [*E. Cheng*, J. Pure Appl. Algebra 186, No. 3, 219–231 (2004; Zbl 1042.18004)], [*E. Cheng*, J. Pure Appl. Algebra 186, No. 2, 109–137 (2004; Zbl 1036.18005)], [*E. Cheng*, Theory Appl. Categ. 11, 353–374 (2003; Zbl 1036.18004)], [*A. Joyal* and *M. Tierney*, Contemp. Math. 431, 277–326 (2007; Zbl 1138.55016)], [*J. E. Bergner*, Homology Homotopy Appl. 14, No. 1, 287–291 (2012; Zbl 1241.55012)], [*J. E. Bergner*, Homology Homotopy Appl. 10, No. 2, 175–193 (2008; Zbl 1155.55006)], [*J. E. Bergner*, Homology Homotopy Appl. 10, No. 2, 149–174 (2008; Zbl 1154.55013)], [`arXiv:1112.0040`], all of which address biased comparison within the realm of algebraic ones or, alternatively, within the kingdom of non-algebraic ones. Comparison between algebraic and non-algebraic ones has been restricted to the case $n = 2$ [*J. W. Duskin*, Theory Appl. Categ. 9, 198–308 (2001; Zbl 1046.18009)], [*T. Leinster*, Theory Appl. Categ. 10, 1–70 (2002; Zbl 0987.18007)], [*S. Lack* and *S. Paoli*, K-Theory 38, No. 2, 153–175 (2008; Zbl 1155.18006)], [*N. Gurski*, J. Pure Appl. Algebra 213, No. 6, 927–946 (2009; Zbl 1188.18004)]. This paper, following [*T. Cottrell*, Cah. Topol. Géom. Différ. Catég. 59, No. 3, 197–259 (2018; Zbl 1405.18003)], compares the algebraic definition of *J. Penon* [Cah. Topologie Géom. Différ. Catégoriques 40, No. 1, 31–80 (1999; Zbl 0918.18006)], [*E. Cheng* and *M. Makkai*, Cah. Topol. Géom. Différ. Catég. 51, No. 3, 205–223 (2010; Zbl 1235.18005)], [*E. Cheng* and *M. Makkai*, Cah. Topol. Géom. Différ. Catég. 50, No. 2, 83–101 (2009; Zbl 1209.18006)] with the non-algebraic one of *Z. Tamsamani* [K-Theory 16, No. 1, 51–99 (1999; Zbl 0934.18008)] by using a nerve construction.

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MSC:

18C15   Triples, algebras for a triple, homology and derived functors for triples
18D05   Double categories, 2-categories, bicategories and generalizations

Keywords:

n-category; higher-dimensional category; nerve construction

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