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Dynamic effect algebras and their representations. (English) Zbl 1318.03059

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Summary: For lattice effect algebras, the so-called tense operators were already introduced by *I. Chajda* and *M. Kolařík* [Math. Slovaca 62, No. 3, 379–388 (2012; Zbl 1324.03026)]. Tense operators express the quantifiers “it is always going to be the case that” and “it has always been the case that” and hence enable us to express the dimension of time in the logic of quantum mechanics. We present an axiomatization of these tense operators and prove that in every effect algebra can be introduced tense operators which, for non-complete lattice effect algebras, can be only partial mappings. An effect algebra equipped with tense operators reflects changes of quantum events from past to future. A crucial problem concerning tense operators is their representation. Having an effect algebra with tense operators, we can ask if there exists a frame such that each of these operators can be obtained by our construction. We solve this problem for (strict) dynamic effect algebras having a full set of homomorphisms into a complete lattice effect algebra.

MSC:

03G12 Quantum logic

03G25 Other algebras related to logic

Cited in 1 Review
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Keywords:

effect algebra; lattice effect algebra; tense operators; dynamic effect algebra

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References:

- [1] Burges J (1984) Basic tense logic. In: Gabbay DM, Günther F (eds) Handbook of philosophical logic, vol II, D. Reidel Publ Comp, pp 89–139
- [2] Chajda I, Halaš R, Kühr J (2009) Many-valued quantum algebras. Algebra Universalis 60:63–90 · Zbl 1219.06013 · doi:10.1007/s00012-008-2086-9
- [3] Chajda I, Kolařík M (2012) Dynamic effect algebras. Mathematica Slovaca (to appear) · Zbl 1324.03026
- [4] Diaconescu D, Georgescu G (2007) Tense Operators on MV-Algebras and Łukasiewicz-Moisil algebras. Fundamenta Informaticae 81:379–408 · Zbl 1136.03045
- [5] Dvurečenskij A, Pulmannová S (2000) New trends in quantum structures, Kluwer Academic Publishers, Dordrecht, Ister Sci, Bratislava · Zbl 0987.81005
- [6] Foulis DJ, Bennett MK (1994) Effect algebras and unsharp quantum logics. Found Phys 24:1325–1346
- [7] Niederle J, Paseka J (2012) On realization of effect algebras (preprint) · Zbl 1274.81010
- [8] Riečanová Z (2000) Generalization of blocks for D-lattices and lattice-ordered effect algebras. Int J Theor Phys 39:231–237 · Zbl 0968.81003 · doi:10.1023/A:1003619806024

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