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Uniform-type structures on lattice-valued spaces and frames. (English)

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Two categories are introduced: the category L -Unif of L -valued uniform spaces (with L a strictly two-sided commutative quantale) and the category L -UFrm of L -valued uniform frames (with L a complete chain). If L is a complete chain, the two categories are related to L -Top (the category of L -topological spaces) and L -Frm (the category of L -valued frames in the sense of *A. Pultr* and *S. E. Rodabaugh* [in: *S. E. Rodabaugh* (ed.) et al., *Topological and algebraic structures in fuzzy sets. A handbook of recent developments in the mathematics of fuzzy sets.* Dordrecht: Kluwer Academic Publishers. Trends Log. Stud. Log. Libr. 20, 153–197 (2003; Zbl 1052.54012)]) in a way analogous to the relationship holding between Unif (the category of uniform spaces) and UFrm (the category of uniform frames), and Top and Frm (the category of frames). Moreover, if L is a Girard quantale, then L -Unif captures the uniform spaces of *B. Hutton* [*J. Math. Anal. Appl.* 58, 559–571 (1977; Zbl 0358.54008)].

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Classification :

*54E15 Uniform structures and generalizations

06D22 Frames etc.

54B30 Categorical methods in general topology