Monoidal closedness of complete residuated lattice-valued generalized convergence groups

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Abstract

Motivated by the work of Zhang et al. [1] on monoidal closed category $(\mathbf{SV\text{-}GConv}, \otimes)$, where $\otimes$ is a tensor product between two stratified V-generalized convergence spaces due to Jäger [2], where V stands for complete residuated lattice; we revisit our previous work on enriched lattice-valued stratified convergence groups [3], in an attempt to generalize these structures in the perspective of monoidal closed category, [4]. Moreover, exploring monoidal closedness of quantale-valued probabilistic convergence spaces under triangular norm due to Herrlich-Zhang [5](see also, [6]), we look at group objects and their categorical behaviors in this monoidal closed category. In so doing, we study various properties of the group objects in their respective categories $(\mathbf{SV\text{-}GConv}, \otimes)$, and $(\mathsf{V}\text{-}\mathbf{ProbConv}^*, \otimes)$. Furthermore, we compare these group objects with a group object in the category of convergence approach spaces, **ConvAp** attributed to Lowen, [7].

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