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Tower extension of topological constructs

Comment.Math.Univ.Carolinae 41,1 (2000) 41-51.

Abstract: Let L be a completely distributive lattice and \mathbf{C} a topological construct; a process is given in this paper to obtain a topological construct $\mathbf{C}(L)$, called the tower extension of \mathbf{C} (indexed by L). This process contains the constructions of probabilistic topological spaces, probabilistic pretopological spaces, probabilistic pseudotopological spaces, limit tower spaces, pretopological approach spaces and pseudotopological approach spaces, etc, as special cases. It is proved that this process has a lot of nice properties, for example, it preserves concrete reflectivity, concrete coreflectivity, and it preserves convenient hulls of topological construct, i.e., the extensional topological hulls (ETH), the cartesian closed topological hulls (CCTH) and the topological universe hulls (TUH) of topological constructs.

Keywords: topological construct, extensionality, cartesian closedness, tower extension, completely distributive lattice

AMS Subject Classification: 54B30, 18B15, 18B30