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Solve[order/topology == quasi-metric/x, x]

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Abstract

In the study of the semantics of programming languages, the qualitative framework using partially ordered sets and the quantitative framework using pseudo-metric spaces have existed separately for years. Smyth however noticed that both concepts can be unified by means of quasi-metric spaces.

Recent literature concerning these "quantitative domains", lacks the canonicity which is so typical for the relationship between topological techniques and theoretical computer science in the classical settings mentioned above. On the one hand, this yields the use of structures which could be considered "ad hoc" from a categorical point of view, such as continuity spaces by Flagg and Kopperman. On the other hand, this yields "incomplete structures", which essentially belong to one of both classical settings, such as the generalized Scott topology by Bonsangue e.a.

We shall discuss a natural generalization of the symbiosis between ordered sets and topology to an analogous relationship between quasi-metric spaces and approach spaces. Approach spaces seem to be an important tool in the study of certain aspects concerning quantitative domains.

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