

Nicolò Zava
Univerza v Vidmu
Videm, Italija

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An introduction to the coarse hyperspace: An insight on its geometric and algebraic properties, Part 1

Coarse geometry, also known as large-scale geometry, is the study of large-scale properties of spaces. It found many applications in different areas of mathematics, for example in geometric group theory and in geometric topology. This theory was initially developed for metric space, but then some (equivalent) generalisations appeared. In particular, Roe introduced coarse spaces as a large-scale counterpart of Weil's definition of uniform spaces via entourages. In this talk, we present the coarse hyperspace, which is the power set of a coarse space endowed with a suitable coarse structure. It was recently introduced, following the ideas of Protasov and Protasova, and miming the construction of the uniform hyperspace, in order to catch the large-scale properties of the metric hyperspace (i.e., the power set of a metric space endowed with the Hausdorff metric). We then discuss basic properties of this object and of some of its coarse subspaces, focusing on connectedness and bounded geometry.