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The large-scale geometry of (a)symmetric spaces

Large-scale geometry, also called coarse geometry, is the study of global, large-scale properties of spaces, ignoring their local, small-scale ones. This theory found many applications in mathematics, for example in geometric group theory and in geometric topology. Until recently, this absolutely general philosophy has been applied only to symmetric spaces, such as metric spaces (in particular, finitely generated groups endowed with word metrics), groups and coarse spaces. The third objects, introduced by J. Roe, are structures encoding large-scale properties of metric spaces. In this talk, we provide an introduction to the classical coarse geometry, recalling definitions and results. Meanwhile, we develop the theory for asymmetric spaces, showing similarities and differences with the classical one. In order to justify the effort, we present several situations where asymmetry naturally arises, for example, quasi-metric spaces (obtained dropping the symmetry request from the definition of metric) and (finitely generated) monoids, which are the non-symmetric counterpart of metric spaces and groups, respectively.