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Large scale geometry from the point of view of shape theory

Abstract: Using ideas from shape theory we embed the coarse category of metric spaces into the category of direct sequences of simplicial complexes with bonding maps being simplicial. Two direct sequences of simplicial complexes are equivalent if one of them can be transformed to the other by contiguous factorizations of bonding maps and by taking infinite subsequences. That embedding can be realized by either Rips complexes or analogs of Roe's anti-Čech approximations of spaces. In that model coarse n-connectedness of $K = K_1 \to K_2 \to \dots$ means that for each k there is $m > k$ such that the bonding map from K_k to K_m induces trivial homomorphisms of all homotopy groups up to and including n. The asymptotic dimension being at most n means that for each k there is $m > k$ such that the bonding map from K_k to K_m factors (up to contiguity) through an n-dimensional complex. Property A of G.Yu is equivalent to the condition that for each k and for each $\varepsilon > 0$ there is $m > k$ such that the bonding map from $|K_k|$ to $|K_m|$ has a contiguous approximation $g\colon |K_k| \to |K_m|$ which sends simplices of $|K_k|$ to sets of diameter at most ε.
(This is joint work with M.Cencelj, A.Vavpetič, and Ž.Virk.)