

## Functorial reducing $pro^*$ -Grp category to $pro$ -Grp

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The coarse shape theory is a relatively new theory, introduced about ten years ago as a generalisation of the shape theory, giving a coarser tool for classifying locally bad topological spaces. We give a new characterisation of coarse shape groups which are essential invariants in this theory. A new functor  $\tilde{R}$  from  $pro^*$ -Grp to  $pro$ -Grp is proposed, enabling us to represent morphisms in  $pro^*$ -category as morphisms in  $pro$ -category between more complex objects. It turns out that  $(\tilde{R} \circ pro^*-\pi_k)(X, x_0)$  is a  $pro$ -coarse shape group  $pro-\tilde{\pi}_k^*(X, x_0)$  for every pointed topological space  $(X, x_0)$ . Furthermore,  $\lim_{\leftarrow} pro-\tilde{\pi}_k^* = \tilde{\pi}_k^*$  holds, so  $pro-\tilde{\pi}_k^*$  is a full analog of  $pro-\pi_k$ . We use this new functor to define coarse shape homology group of a topological space. The Hurewicz theorem, fundamental result of algebraic topology that relates homotopy and homology groups, was established also for  $pro$ -groups as well as for  $pro^*$ -groups, and now we bring its version for  $pro$ -coarse shape groups. This enables us to relate coarse shape groups and coarse shape homology groups. We prove that the first nontrivial coarse shape group and coarse shape homology group of a pointed continuum are isomorphic, assertion that does not hold for shape groups. This is joint work with Nikola Koceić Bilan.