Universal G-spaces for proper actions of locally compact groups

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We establish the existence of universal G-spaces for proper actions of locally compact groups on Tychonoff spaces. A typical result sounds as follows: for each infinite cardinal number \(\tau\) every locally compact, non-compact, \(\sigma\)-compact group \(G\) of weight \(w(G) \leq \tau\), can act properly on \(\mathbb{R}^{\tau}\setminus\{0\}\) such that \(\mathbb{R}^{\tau}\setminus\{0\}\) contains a \(G\)-homeomorphic copy of every Tychonoff proper \(G\)-space of weight \(\leq \tau\). The metric cones \(\text{Cone}(G/H)\) with \(H \subseteq G\) a compact subgroup such that \(G/H\) is a manifold, are the main building blocks in our approach. As a byproduct we prove that the cardinality of the set of all conjugacy classes of such subgroups \(H \subseteq G\) does not exceed the weight of \(G\). © 2011 Elsevier B.V..

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