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Commuting Elements and Simplicial Spaces of Homomorphisms

Using spaces of homomorphisms and the descending central series of the free groups, simplicial spaces are constructed for each integer $q > 1$ and every topological group G, with realizations $B(q, G)$ that filter the classifying space BG. In particular for $q = 2$ this yields a single space $B(2, G)$ assembled from all the n-tuples of commuting elements in G. Related stable splittings for spaces of commuting elements in a compact Lie group will also be discussed.