Equivariant Categories of Double Loop Spaces

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We study the classical correspondence between the equivariant homotopy category of a topological group G and the homotopy category of spaces equipped with a map to its classifying space BG.

Our principal aim is to extend this correspondence to double loop spaces in two ways. One way is based on the notion of action of the loop space ΩG on another space X by self-homotopies of the identity map of X. The second way is by considering the braided topological group A equivalent to ΩG. We are going to show that the aforementioned homotopy categories are also equivalent to the category of topological groups equipped with an action of A by continuous group automorphisms, compatible in certain way with the braiding of A.

A further generalization will be mentioned obtained by relaxing the compatibility of action of A with the braiding, and what kind of extension of the G-equivariant category this larger category corresponds to.