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Hom-Associative Group Cohomology

We continue to investigate proper homological algebra for non-associative objects. We introduce homology and cohomology theories for a Hom-associative group G which is a non-associative version of the notion of group. For this, we introduce representation theory of Hom-groups. For certain coefficients, the functoriality of Hom-group (co)homology will be shown. We see that the inverse elements provide a relation between Hom-group cohomology and homology with coefficients in right and left G-modules. Furthermore we find a relation between Hom-group (co)homology of G and the Hochschild (co)homology of Hom-associative group algebra kG.