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**Stefan A. Forcey\*** ([sforcey@tnstate.edu](mailto:sforcey@tnstate.edu)), Tennessee State University, Dept. of Physics and Mathematics, 3500 John A. Merritt Blvd., Nashville, TN 37209-1561. *Multiplihedra: polytopes, pasting, and parameterized enrichment.*

The multiplihedra were invented by Stasheff, described by Iwase and Mimura, and generalized by Boardman and Vogt. They represent the fundamental structure of a weak map between weak structures, such as weak  $n$ -categories or  $A_n$  spaces. They form a bimodule over the associahedra, and collapse to become the associahedra in the special case of a strict range structure.

Here we present an algorithm for finding the vertices in Euclidean space whose convex hull is the  $n^{th}$  multiplihedron, answering the open question of the existence of a convex polytope realization of the multiplihedra.

This algorithm involves a parameter  $q$  in  $(0, 1)$  which at 1 or 0 yields the limiting polytopes which correspond to the respective cases of a strict range or strict domain. In the latter case the multiplihedra collapse to form a new family of polytopes which was noticed first in the study of the cocycle conditions of weak enrichment over a strict  $n$ -category. Thus there is a hint that a general definition of weak enrichment should be based upon bimodules. (Received July 02, 2007)