1139-62-275 **Elisa Perrone*** (eperrone@mit.edu), Massachusetts Institute of Technology, 77 Massachusetts Ave, Cambridge, MA 02138. *The geometry of discrete copulas.*

Copulas are functions which serve as a flexible tool for constructing diverse stochastic dependences among random vectors. The focus of this work is on studying discretized versions of copulas, namely *discrete copulas*, which are fascinating geometric objects of great importance for empirical modeling in the applied sciences. In particular, we here analyze mathematical features of discrete copulas, and define their geometry in terms of their related convex polytopes. First, we highlight fundamental connections between discrete copulas and generalizations of the Birkhoff polytope. Then, we present a geometric approach to describe families of discrete copulas with prescribed stochastic dependence properties through features of their associated polytopes. Finally, we discuss how our geometric findings could possibly open the door to constructing new statistical tests for copulas and smooth approximators of analytically unfeasible copulas.

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