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Jesus De Loera, Elisha Peterson and Francis Edward Su* (su@math.hmc.edu). *A polytopal generalization of Sperner's lemma, and applications.*

Sperner's lemma is a statement about labelled triangulations of simplices whose applications include: finding fixed points of highly nonlinear functions, and computing Nash equilibria in game theory. We prove a generalization of Sperner's lemma for polytopes and demonstrate applications to cutting multiple cakes with linked preferences, triangulations of polytopes, and the game of Hex. A constructive proof of the polytopal Sperner lemma gives methods for computing solutions in applications. (Received September 21, 2017)