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Cindy Traub* (cmtraub@smcm.edu), 18952 E. Fisher Rd., St. Mary's City, MD 20686-3001. *A connection between topology, k -ellipses and the minimum weight triangulation problem.*

The problem of finding the minimum weight triangulation of a planar point set is a classic problem in computational geometry. No known algorithm exists which can find this type of triangulation “quickly” for any finite input set of points in the plane, and this problem was shown to be NP-hard by Mulzer and Rote in 2006. The addition of points to an input set can have surprising effects on minimum triangulation weight. We prove that interesting topology arises in this setting. This topology is due in part to a curve known as the *k -ellipse*, the set of all points in \mathbb{R}^2 whose summed distance to k distinct foci is constant. (Received January 22, 2007)