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The sutured Floer polytope and taut depth one foliations

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For closed 3-manifolds Ozsv\'ath and Szab\'o, Ni, and Hedden show that there exists a certain duality between an appropriate flavour of the Heegaard Floer polytope and the Thurston norm unit ball. For instance, extremal vertices of the HF^+ polytope carrying the group Z correspond bijectively to the fibred faces of the Thurston norm unit ball.

We prove a similar result for sutured manifolds and taut depth one foliations. Equivalence classes of taut depth one foliations of a sutured manifold form foliation cones, defined by Cantwell and Conlon. We show that the extremal vertices of the sutured Floer polytope carrying the group Z correspond bijectively to these foliation cones. Moreover, the foliation cones are subtended by the foliated faces of an asymmetric seminorm arising from the dual sutured Floer polytope. In some cases this seminorm has a purely geometric definition akin to that of the sutured Thurston norm.

An important step in our work is the following fact: a sutured manifold admits a fibration or a taut depth one foliation whose sole compact leaves are on the boundary of the manifold if and only if there is a surface decomposition of the sutured manifold resulting in a connected product manifold.

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