1128-53-146 **Sharif Ibrahim*** (ams2017@sharifibrahim.com), **Bala Krishnamoorthy** and **Kevin Vixie**.
Some minimal shape decompositions are nice.

The space of currents (representing generalized surfaces) under the flat norm has rich theoretical interest including, for example, the existence of area-minimizing surfaces. Computing the flat norm is equivalent to optimally decomposing a given d-dimensional current into d- and (the boundary of) $(d+1)$-dimensional pieces. We consider integral currents (a class which includes all compact oriented manifolds with boundary and integer multiplicities) and find conditions under which the optimal decomposition can be assumed integral as well. In applications, preserving integrality helps ensure the decomposition is physically meaningful. Our approach moves between the simplicial complex and continuous settings, combining a deformation theorem on simplicial complexes with the continuous polyhedral approximation and compactness theorems. For d-dimensional currents in $\mathbb{R}^n$, we prove integrality is preserved for $d < n = 2$ and present a framework (relying on a triangulation conjecture) for $d = n - 1$ even for non-boundary currents. Lastly, we demonstrate counterexamples exist whenever $1 \leq d \leq n - 3$. (Received February 23, 2017)