

TGTC 2020: TITLE AND ABSTRACT

Stationary Surfaces for Curvature Functionals

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Abstract: The critical points of functionals which depend on the curvature invariants of an immersed surface often serve as idealized models for observable quantities such as surfactant films or material interfaces. Abstracting this idea, we consider the first variation of a generalized “bending energy” functional on surface immersions whose integrand depends smoothly on the mean and Gauss curvatures. Given appropriate boundary conditions, it is shown that the problem of determining the stationary surfaces for a curvature functional depends strongly on its behavior under uniform dilations, as well as whether or not these surfaces have rotational symmetry. This fact yields new consequences for free-boundary Willmore surfaces, as well as the critical points of any functional whose integrand depends analytically on the mean curvature.