Texas Tech University. Analysis Seminars.

Curvature functionals and p-Willmore energy

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ABSTRACT. Functionals involving surface curvature are frequently encountered when modeling the behavior of important biological structures such as lipid membranes. To better understand these objects, we consider a general functional on surface immersions which is dependent on the surface mean and Gauss curvatures. Variations of this functional are presented, and stability criteria are given in terms of basic geometric invariants coming from the surface fundamental forms. These results are then applied to a particular curvature functional which generalizes the Willmore energy, and a nonexistence result is presented. A constrained minimization problem is then considered, leading to a stability result involving round spheres.