A quasiconformal Hopf soap bubble theorem

Marcos Paulo TASSI

Università degli studi dell'Aquila, Italy

A surface immersed in a Riemannian three-manifold is said to be quasiconformal if its principal curvature diagram lies in a wedge defined by two straight lines of negative slope. In this talk we present a quasiconformal version of the classical Hopf Soap Bubble Theorem for constant mean curvature surfaces, which is a joint work with J.A. Gálvez and P. Mira. Our theorem establishes round spheres as the only quasiconformal compact surfaces of genus zero in Euclidean 3-space. We present a sketch of its proof which relies on the Bers-Nirenberg representation of solutions to linear elliptic equations with discontinuous coefficients. Our result solves an old open problem by H. Hopf, stated in his classical book, and it generalizes, among others, Hopf's theorem for constant mean curvature spheres, the classification of round spheres as the only compact elliptic Weingarten surfaces of genus zero, and the uniqueness theorem for ovaloids by Han, Nadirashvili and Yuan.