

The geometry of overdetermined semilinear equations in the plane

Antonio Ros (University of Granada)

Given a planar domain Ω and a function $f(t)$ we consider bounded positive solutions of the overdetermined problem

$$\Delta u + f(u) = 0 \text{ in } \Omega$$

$$u = 0 \text{ and } \partial u / \partial n = C \text{ on } \partial \Omega$$

If Ω is bounded, then by a classical result of Serrin, Ω is a disc and u is radial. If the domain is unbounded the shape of Ω and u are not so rigid. We present some theorems about that situation. These results show some relationship with the Geometry properly embedded minimal and constant mean curvature surfaces in \mathbb{R}^3 .

This is a joint work with David Ruiz and Pieralberto Sicbaldi.