

# The Bernstein problem for Weingarten surfaces

Isabel Fernández\*

Departamento de Matemática Aplicada I  
Universidad de Sevilla

## Abstract

A surface in Euclidean 3-space is an elliptic Weingarten surface if its mean curvature  $H$  and Gaussian curvature  $K$  are related by a smooth, elliptic equation  $W(H, K) = 0$ . A well known open problem, proposed for instance by Rosenberg and Sa Earp in 1994, is to solve the Bernstein problem for this class of surfaces, that is: are planes the only entire elliptic Weingarten graphs? Up to now, it is only known that the answer is positive if the Weingarten equation is uniformly elliptic; this follows from a deep theorem by L. Simon on entire graphs with quasiconformal Gauss map. In this talk we present two theorems. In the first one, we extend the solution to the Bernstein problem in the uniformly elliptic case to multigraphs, proving that planes are the only complete uniformly elliptic Weingarten surfaces whose Gauss map image lies in an open hemisphere. In the second one, we will solve in the affirmative the Bernstein problem for Weingarten graphs for a large class of non-uniformly elliptic Weingarten equations. This is a joint work with P. Mira and José A. Gálvez.

---

\*e-mail: isafer@us.es