NONLOCAL s-MINIMAL SURFACES AND LAWSON CONES

Por: Davila, J (Davila, Juan)[1,2] ; del Pino, M (del Pino, Manuel)[1,2] ; Wei, JC (Wei, Juncheng)[3,4]

JOURNAL OF DIFFERENTIAL GEOMETRY
Volumen: 109
Número: 1
Páginas: 111-175
DOI: 10.4310/jdg/1525399218
Fecha de publicación:MAY 2018
Tipo de documento: Article
Ver impacto de la revista

Abstract

The nonlocal s-fractional minimal surface equation for Sigma = partial derivative E where E is an open set in R-N is given by

H-Sigma(s)(p) := integral(RN) chi E(x) - chi E-c(x)/vertical bar x - p vertical bar N + s dx = 0 for all p is an element of Sigma

Here 0 < s < 1, chi designates characteristic function, and the integral is understood in the principal value sense. The classical notion of minimal surface is recovered by letting s -> 1. In this paper we exhibit the fi rst concrete examples (beyond the plane) of nonlocal s minimal surfaces. When s is close to 1, we fi rst construct a connected embedded s-minimal surface of revolution in R-3, the nonlocal catenoid, an analog of the standard catenoid vertical bar x(3)vertical bar = log(r + root r(2) - 1). Rather than eventual logarithmic growth, this surface becomes asymptotic to the cone vertical bar x(3)vertical bar = r root 1 - s. We also find a two-sheet embedded s-minimal surface asymptotic to the same cone, an analog to the simple union of two parallel planes.

On the other hand, for any 0 < s < 1, n, m >= 1, s-minimal Lawson cones vertical bar v vertical bar = alpha vertical bar u vertical bar, (u, v), is an element of R-n x R-m, are found to exist. In sharp contrast with the classical case, we prove their stability for small s and n + m = 7, which suggests that unlike the classical theory (or the case s close to 1), the regularity of s-area minimizing surfaces may not hold true in dimension 7.

Palabras clave

KeyWords Plus:LEVEL SET APPROACH; INEQUALITY; REGULARITY; CONSTANT

Información del autor

Dirección para petición de copias: Davila, J (autor para petición de copias)

Univ Chile, Dept Ingn Matemat, Casilla 170 Correo 3, Santiago, Chile.

Dirección para petición de copias: Davila, J (autor para petición de copias)

Univ Chile, CMM, Casilla 170 Correo 3, Santiago, Chile.

Direcciones:

[1] Univ Chile, Dept Ingn Matemat, Casilla 170 Correo 3, Santiago, Chile

[2] Univ Chile, CMM, Casilla 170 Correo 3, Santiago, Chile

[3] Univ British Columbia, Dept Math, Vancouver, BC V6T 1Z2, Canada

[4] Chinese Univ Hong Kong, Dept Math, Shatin, Hong Kong, Peoples R China

Direcciones de correo electrónico:jdavila@dim.uchile.cl; delpino@dim.uchile.cl; jcwei@math.ubc.ca

Financiación

Entidad financiadora	Número de concesión
NSERC of Canada	
Fondecyt	1130360 1150066
Fondo Basal CMM	
Millenium Nucleus CAPDE	NC130017

Ver texto de financiación

Editorial

INT PRESS BOSTON, INC, PO BOX 43502, SOMERVILLE, MA 02143 USA

Información de la revista

- **Impact Factor:** Journal Citation Reports

Categorías / Clasificación

Áreas de investigación: Mathematics

Categorías de Web of Science: Mathematics

Información del documento

Idioma: English

Número de acceso: WOS:000438305900004

ISSN: 0022-040X

eISSN: 1945-743X