Existence and uniqueness of monotone wavefronts in a nonlocal resource-limited model

Por: Trofimchuk, E (Trofimchuk, Elena)[1]; Pinto, M (Pinto, Manuel)[2]; Trofimchuk, S (Trofimchuk, Sergei)[3]

PROCEEDINGS OF THE ROYAL SOCIETY OF EDINBURGH SECTION A-MATHEMATICS
Volumen: 150
Número: 5
Páginas: 2462-2483
Número de artículo: PII S0308210519000313
DOI: 10.1017/prm.2019.31
Fecha de publicación: OCT 2020
Tipo de documento: Article
Ver impacto de la revista

Abstract

We are revisiting the topic of travelling fronts for the food-limited (FL) model with spatio-temporal nonlocal reaction. These solutions are crucial for understanding the whole model dynamics. Firstly, we prove the existence of monotone wavefronts. In difference with all previous results formulated in terms of 'sufficiently small parameters', our existence theorem indicates a reasonably broad and explicit range of the model key parameters allowing the existence of monotone waves. Secondly, numerical simulations realized on the base of our analysis show appearance of non-oscillating and non-monotone travelling fronts in the FL model. These waves were never observed before. Finally, invoking a new approach developed recently by Solaret al., we prove the uniqueness (for a fixed propagation speed, up to translation) of each monotone front.

Palabras clave

Palabras clave de autor: food-limited model; monotone wave; nonlocal interaction; existence; uniqueness
KeyWords Plus: REACTION-DIFFUSION EQUATIONS; TRAVELING FRONTS; POPULATION-MODEL; ASYMPTOTIC-BEHAVIOR; KPP EQUATION

Información del autor

Dirección para petición de copias:
Ministry of Education & Science of Ukraine Igor Sikorsky Kyiv Polytechnic Institute Igor Sikorsky Kyiv Polytech Inst, Dept Differential Equat, Kiev, Ukraine.
Dirección correspondiente: Trofimchuk, E (autor correspondiente)

+ Igor Sikorsky Kyiv Polytech Inst, Dept Differential Equat, Kiev, Ukraine.

Direcciones:

[1] Igor Sikorsky Kyiv Polytech Inst, Dept Differential Equat, Kiev, Ukraine

[2] Univ Chile, Fac Ciencias, Santiago, Chile

[3] Univ Talca, Inst Matemat & Fis, Talca, Chile

Direcciones de correo electrónico:trofimch@imath.kiev.ua; pintoj.uchile@gmail.com; trofimch@inst-mat.utalca.cl

Financiación

Entidad financiadora Mostrar más información	**Número de concesión**
Comision Nacional de Investigacion Cientifica y Tecnologica (CONICYT) CONICYT FONDECYT	1190712 1170466

Ver texto de financiación

Editorial

CAMBRIDGE UNIV PRESS, EDINBURGH BLDG, SHAFTESBURY RD, CB2 8RU CAMBRIDGE, ENGLAND

Información de la revista

- **Impact Factor:** Journal Citation Reports

Categorías / Clasificación

Áreas de investigación: Mathematics

Categorías de Web of Science: Mathematics, Applied; Mathematics

Información del documento

Idioma: English

Número de acceso: WOS:000572396300013

ISSN: 0308-2105

eISSN: 1473-7124