

1. [Noticia IMI](#)
2. [Eventos del 4 al 8 de julio de 2022](#)
3. [Nuevas publicaciones](#)
4. [Otros eventos previstos](#)
5. [Participación de miembros del IMI en eventos organizados por otras instituciones](#)
6. [La viñeta matemática](#)

1) Noticia IMI

29 de junio de 2022. Aprobados dos nuevos proyectos de investigación adscritos al IMI en la resolución provisional de concesión de ayudas 2021 a «PROYECTOS DE GENERACIÓN DE CONOCIMIENTO» en el marco del Programa Estatal para Impulsar la Investigación Científico-Técnica y su Transferencia, del Plan Estatal de Investigación Científica, Técnica y de Innovación 2021-2023. Enhorabuena a Enrique Arrondo y Marina Logares (IPs de uno de los proyectos concedidos) y a Valeri Makarov (IP del otro proyecto).



Enrique Arrondo



Marina Logares



Valeri Makarov

2) Eventos del 4 al 8 de julio de 2022

Seminario de Matemática Aplicada (Prelectura de Tesis Doctoral)

Title: Nonlinear Spectral Theory and its application to Geometry and Topology.

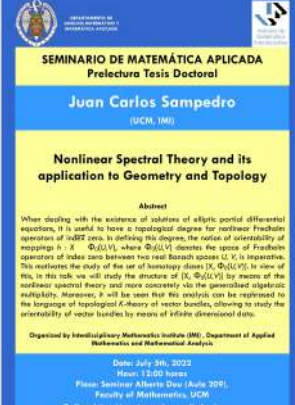
Speaker: Juan Carlos Sampedro (UCM, IMI)

Date: July 5th, 2022

Hour: 12:00h

Place: Seminario Alberto Dou (Aula 209), Faculty of Mathematics, UCM and [Google Meet](#)

Organized by: Interdisciplinary Mathematics Institute (IMI), Department of Applied Mathematics and Mathematical Analysis



SEMINARIO DE MATEMÁTICA APLICADA
Prelectura Tesis Doctoral

Juan Carlos Sampedro
(UCM, IMI)

Nonlinear Spectral Theory and its application to Geometry and Topology

Abstract

When dealing with the existence of solutions of elliptic partial differential equations, it is useful to have a topological degree for nonlinear Fredholm operators of index zero. In defining this degree, the notion of orientability of mappings $h: X \rightarrow \Phi(\mathbb{R}^n, \mathbb{R}^n)$ where $\Phi(\mathbb{R}^n, \mathbb{R}^n)$ denotes the space of Fredholm operators of index zero between two real Banach spaces U, V is important. This motivates the study of the set of homotopy classes $\mathcal{K}(\Phi(\mathbb{R}^n, \mathbb{R}^n))$ in view of this. In this talk we will study the structure of $\mathcal{K}(\Phi(\mathbb{R}^n, \mathbb{R}^n))$ by means of the nonlinear spectral theory and more concretely via the generalized algebraic multiplicity. Moreover, it will be seen that this multiplicity can be expressed in the language of topological K -theory of vector bundles, allowing to study the orientability of vector bundles by means of finite dimensional data.

Organized by Interdisciplinary Mathematics Institute (IMI), Department of Applied Mathematics and Mathematical Analysis

Date: July 5th, 2022
Hour: 12:00 hours
Place: Seminario Alberto Dou (Aula 209), Faculty of Mathematics, UCM
Online: <https://meet.google.com/wh-cthw-gpy>

Título: Seminario sobre la mejora del consejo científico para la gestión sostenible de pesquerías con un elevado valor económico y ecológico en las áreas del ICES y NAFO.

Coordinador: José María Maroto (IMI-UCM)

Conferenciantes: José María Maroto (IMI-UCM), Santiago Cerviño (IEO-CSIC, ICES) y Diana González Troncoso (IEO-CSIC, NAFO)

Día: Miércoles, 6 de Julio de 2022

Hora: 9:30h

Lugar: Sala de Tesis del Pabellón Central (Decanato), Facultad de Ciencias Económicas y Empresariales, UCM

Más información: Hacer click [aquí](#)



3) Nuevas publicaciones

P. Almirón, M. Schulze, Limit spectral distribution for non-degenerate hypersurface singularities. *Comptes Rendus. Mathématique*, 2022, 360, pp. 699-710. <https://doi.org/10.5802/crmath.335>

J. Carmona Tapia, J. Fernández-Sánchez, J.B. Seoane-Sepúlveda, W. Trutshnig, Lineability, spaceability, and latticeability of subsets of $C([0, 1])$ and Sobolev spaces. *Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas*, 2022, 116, 113. <https://doi.org/10.1007/s13398-022-01256-y>

4) Otros eventos previstos

Lectura de Tesis Doctoral

Title: Analytic invariants of isolated hypersurface singularities and combinatorial invariants of numerical semigroups.

Speaker: Patricio Almirón Cuadros

Date: 11 July 2022

Hour: 16:00h

Place: Sala de Grados, Facultad de CC Matemáticas, UCM y [Google Meet](#)

Lectura de Tesis Doctoral
Patricio Almirón Cuadros
Universidad Complutense de Madrid

Analytic invariants of isolated hypersurface singularities and combinatorial invariants of numerical semigroups

The first part of the thesis deals with analytic and topological invariants of an isolated hypersurface singularity. Our main contribution here is the following: for an isolated normal hypersurface for the maximal torus number in an multiplicity class of a plane branch in terms of topological invariants of the branch, we obtain an explicit formula for the number of curves in the quotient of the Milnor and Tjuria numbers of an isolated plane curve singularity. We extend this formula to isolated surface singularities in 2-variables. Moreover, we show the connection of the extended quotient with an old formula conjectured (proved by Durfee, Hensley, and Swanson) for such a connection for the spectrum of a normal non-degenerate isolated hypersurface singularity, and link this problem with the generalization of Durfee and Swanson's question. As a consequence, this provides a new way of understanding the important role of Durfee's conjecture in the context of isolated hypersurface singularities.

The second part deals with numerical semigroups and their combinatorics. First, we address Weyl's conjecture on numerical semigroups. In this direction, we present two necessary conditions for a numerical semigroup to have negative Ehrhart number and we show 24 new examples of numerical semigroups with negative Ehrhart number satisfying Weyl's conjecture. One of our main contributions to Weyl's conjecture is to propose an alternative to establish non-emptiness of numerical semigroups, which provides a new insight in some related problems in Weyl's conjecture. We provide a formula for the conductor of a semigroup over a maximal order in a number field and its consequences on some generalizations of Weyl's conjecture in the particular case. Finally, we show that the class of all realizable non-emptiness of an irreducible plane curve singularity with one Puiseux pair providing a partial generalization of Weyl's conjecture and finally show that the total singularity of an irreducible plane curve singularity, in a consequence, we deduce some new features about the value set of Weyl's invariant of an irreducible plane curve singularity with one Puiseux pair.

Directores: Alejandro Flores Hernández y María Alejandra Carralón

Fecha: 11 de Julio, 2022 **Hora:** 16:00
Lugar: Sala de Grados Facultad de Matemáticas UCM y meet.google.com/ghcvtkr-gpm (Google Meet)

Lectura de Tesis Doctoral

Título: Predicción dinámica bayesiana a gran escala para series temporales de conteo.

Conferenciante: Bruno Flores Barrio

Día: 12 de julio de 2022

Hora: 12:00h

Lugar: Sala de grados (250C), Facultad de CC Matemáticas, UCM

DEFENSA DE TESIS DOCTORAL
Bruno Flores Barrio

Predicción Dinámica Bayesiana a Gran Escala para Series Temporales de Conteo

Director:
David Ríos Insua (ICMAT)

Tutor:
Begoña Vitoriano (IME-UCM)

Programa de doctorado:
IMEIO Ingeniería Matemática, Estadística e Investigación Operativa (UCM-UPM)

IMI Data Science Club (www.ucm.es/imi/imi-data-science-club)

Fecha: Martes 12 de Julio 2022
Hora: 12:00h
Lugar: Sala de Grados (250C)
Facultad de CC Matemáticas, UCM

5) Participación de miembros del IMI en eventos organizados por otras instituciones

Luis Vázquez will give an invited talk in the following conference:

Title: **The Applied Mathematics and Modelling in the Path from Physics to Biology**

Speaker: Luis Vázquez

Date: 2 July 2022

Place: Istanbul

More info: See [ICAAM 2022](https://www.icaam2022.com/)

Gonzalo Barderas, Pilar Romero and Luis Vázquez will give invited talks in the following conference:

Title: **Ages of Mars**

Dates: 4-8 July 2022

Program: See <https://ucm.es/agesofmars/program>

Place: San Lorenzo de El Escorial (Madrid)



Luis Vázquez will give a talk in the following conference:

Title: **XXI Arrábida meeting on Complexity: From complexity to nonlocality and competition of space/time scales**

Speaker: Luis Vázquez

Date: 5 July 2022

Hour: 15:00

Place: Arrábida Monastery, Portugal



XXI Arrábida meeting on Complexity, July 4-6 2022

"Mathematics as decoder of the natural world complexity"

Schedule

	Monday, July 4	Tuesday, July 5	Wednesday, July 6
9:30 - 10:00	T. Braga	José Carajá	Filipe G. Santos
10:30 - 11:00	Coffee break	Coffee break	Coffee break
11:00 - 12:00	A. M. Nunes	Eric Catten	R. Araújo
12:00 - 13:00	G. Bouchène	M. Yvette Gomes	P. Veiga
13:00 - 13:30	Lunch	Lunch	Lunch
13:30 - 14:00	T. L. Braga	L. Vainikko	J. F. Rodrigues
14:00 - 15:00	P. Brusa	F. Saldanha da Gama	R. Vilela Mendes
15:00 - 16:00	General Discussion	Francisco C. Santos	General Discussion
20:00	Dinner	Dinner	



Begoña Vitoriano participará como organizadora externa de la siguiente **Escuela CIMPA**.

Título: **Métodos Algebraicos en Topología.**

Días: 11-22 Julio 2022

Lugar: Universidad de El Salvador, San Salvador (El Salvador)

Enlace al evento: <https://ecimpasv2020.org/>

Courses

- **Topology of function spaces**
Diana Toledo and Ingrid Pizarro, Universidad de El Salvador
- **Categories and modules**
Renee Remond, Universidad de Guadalajara
- **Algebraic topology from a homological viewpoint**
Alexandra Tugui, Universidade de Pernambuco, Brazil
- **The categorical point of view for Thom spectra**
Óscar Alzola, Universidad de los Andes, Colombia
- **Foundations of homological algebra applied to modules**
Karl Dothner, Universität Chemnitz, Germany
- **Algebraic K-Theory and connections to Topology**
Hajime Eshenbek, University of Tsukuba

Website: ecimpasv2020.org

6) La viñeta matemática

Viñeta enviada por los hermanos Ángel y José Luis González Fernández, creadores de "Troncho y Poncho".



Instituto de Matemática Interdisciplinar
Universidad Complutense de Madrid
Plaza de Ciencias 3, 28040, Madrid
<https://www.ucm.es/imi>

Haga click aquí para recibir el *Boletín del IMI* / Click here to receive the *Boletín del IMI*
Para dejar de recibir el *Boletín del IMI* escriba a secreadm.imi@mat.ucm.es / To unsubscribe send an email to secreadm.imi@mat.ucm.es
Los anteriores boletines se pueden encontrar en / Previous bulletins can be found at <https://www.ucm.es/imi/boletin-del-imi>