

1. [Eventos del 28 de febrero al 4 de marzo de 2022](#)
2. [Nuevas publicaciones](#)
3. [Eventos previstos](#)
4. [Participación de miembros del IMI en eventos organizados por otras instituciones](#)
5. [La viñeta matemática](#)

1) Eventos del 28 de febrero al 4 de marzo de 2022

Seminario de Matemática Aplicada

Título: On a quasilinear elliptic equation with Steklov nonlinear boundary conditions of critical growth

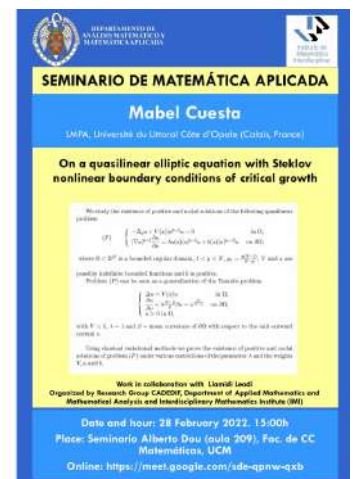
Conferenciante: Mabel Cuesta (LMPA, Université du Littoral Côte d'Opale, Calais, France)

Día: 28 February 2022

Hora: 15:00h

Lugar: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM y [Google Meet](#)

Organizado por: Research Group CADEDIF, Department of Applied Mathematics and Mathematical Analysis and Interdisciplinary Mathematics Institute (IMI)



SEMINARIO DE MATEMÁTICA APLICADA
Mabel Cuesta
LMPA, Université du Littoral Côte d'Opale, France
On a quasilinear elliptic equation with Steklov nonlinear boundary conditions of critical growth
Resumen: We consider the existence of positive and radial solutions of the following quasilinear problem:
$$\begin{cases} -\operatorname{div}(\lambda(x)|\nabla u|^{p(x)-2}\nabla u) + \lambda(x)|u|^{q(x)-2}u = 0 & \text{in } \Omega, \\ \lambda(x)|u|^{q(x)-2}u = \beta(x)|u|^{r(x)-2}u & \text{on } \partial\Omega, \end{cases}$$
where $\Omega \subset \mathbb{R}^N$ is a bounded domain, $1 < p(x) < \infty$, $1 < q(x) < \infty$, $1 < r(x) < \infty$, $\lambda(x) > 0$ and $\beta(x) > 0$ are measurable functions satisfying some growth conditions. We study the existence of positive solutions for this problem.
Palabras clave: Steklov boundary conditions, quasilinear elliptic equations, critical growth.
2020 Mathematics Subject Classification: 35J20, 35Q20, 35Q30, 35Q40, 35Q60, 35Q65, 35Q70, 35Q72, 35Q73, 35Q74, 35Q75, 35Q76, 35Q77, 35Q78, 35Q79, 35Q80, 35Q81, 35Q82, 35Q83, 35Q84, 35Q85, 35Q86, 35Q87, 35Q88, 35Q89, 35Q90, 35Q91, 35Q92, 35Q93, 35Q94, 35Q95, 35Q96, 35Q97, 35Q98, 35Q99.
Work in collaboration with Laurent Lévêque.
Organized by Research Group CADEDIF, Department of Applied Mathematics and Mathematical Analysis and Interdisciplinary Mathematics Institute (IMI).
Date and hour: 28 February 2022, 15:00h
Place: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM
Online: <https://meet.google.com/sde-qpnw-qxb>

Colloquium de Análisis Matemático

Title: Embeddings between Lorentz-type spaces

Speaker: Tugce Ünver Yildiz (Institute of Mathematics of the Czech Academy of Sciences)

Day: 3 March 2022

Hour: 13:00h

Place: Aula 222 Facultad de CC Matemáticas, UCM and [Google Meet](#)

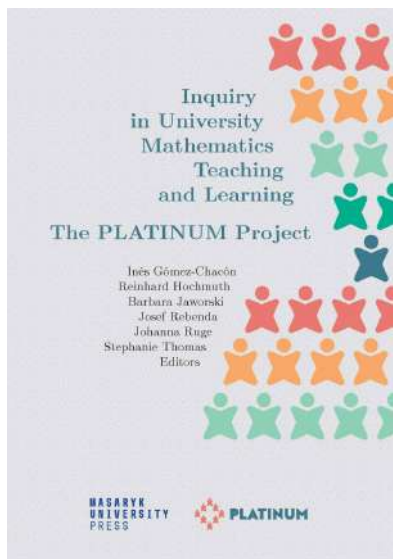
Organized by: Department of Applied Mathematics and Mathematical Analysis and Interdisciplinary Mathematics Institute (IMI)



COLLOQUIUM DE ANÁLISIS MATEMÁTICO
Tugce Ünver Yildiz
Institute of Mathematics of the Czech Academy of Sciences
Embeddings between Lorentz-type spaces
Resumen: In this talk, we will consider the function spaces $S^p(\lambda, \nu)$ whose norms involve the function $S^p(\lambda, \nu)$, where $S^p(\lambda, \nu)$ is the non-increasing rearrangement of measurable function S vs. λ, ν . We will concentrate on the embedding relations between spaces of $S^p(\lambda, \nu)$ and the classical Lorentz spaces of type $S^p(\lambda, \nu)$ and $S^p(\lambda, \nu)$; more specifically, we will characterize the embeddings $S^p(\lambda, \nu) \hookrightarrow S^q(\lambda, \nu)$ without any parameter or weight constraints. The usage of duality methods is the primary cause of the parameter restrictions that exist in previous works. We perform discretization and anti-discretization techniques, and as a consequence, we extend the earlier results by providing a complete characterization of all possible embeddings between spaces $S^p(\lambda, \nu)$ and $S^q(\lambda, \nu)$.
Organizado por el Departamento de Análisis Matemático y Matemática Aplicada y el Instituto de Matemática Interdisciplinar (IMI).
Fecha: Jueves 3 de marzo de 2022
a las 13:00 horas
Lugar: Aula 222
<https://meet.google.com/cjp-wizt-qrc>
Facultad de CC Matemáticas, UCM

2) Nuevas publicaciones

I. M. Gómez-Chacón, R. Hochmuth, B. Jaworski, J. Rebenda, J. Ruge S. Thomas (Editors). *Inquiry in University Mathematics Teaching and Learning: The PLATINUM Project*. Masaryk University Press. 2021. ISBN 978-80-210-9982-1 e-ISBN 978-80-210-9983-8. <https://doi.org/10.5817/CZ.MUNI.M210-9983-2021>



3) Eventos previstos

Seminario de Matemática Aplicada

Title: Bifurcation and multiplicity results for elliptic problems with subcritical nonlinearity on the boundary

Speaker: Maya Chhetri (University of North Carolina Greensboro)

Day: 7 March 2022

Hour: 15:00h

Place: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM y [Google Meet](#)

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

SEMINARIO DE MATEMÁTICA APLICADA
Maya Chhetri
University of North Carolina Greensboro
Bifurcation and multiplicity results for elliptic problems with subcritical nonlinearity on the boundary
We consider an elliptic problem coupled with a nonlinear boundary condition, involving nonlinearity with super-linear and subcritical growth at infinity, with a bifurcation parameter as a factor. We will discuss the number of positive solutions with respect to the bifurcation parameter depending on the behavior of the nonlinearity at infinity and at zero. We will combine the re-creating argument with degree theory and bifurcation theory to prove results. The talk is based on a joint work with S. Bandyopadhyay, B. B. Debnath, H. Monteiro and R. Pardo.
Organized by Research Group CADEDIF, Department of Applied Mathematics and Mathematical Analysis and Interdisciplinary Mathematics Institute (IMI)
Date and hour: 7 March 2022, 15:00h
Place: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM
Online: <https://meet.google.com/sde-qprw-qxb>

Seminario de Matemática Aplicada

Título: Desigualdad de Harnack para ecuaciones fraccionarias elípticas en forma de no divergencia

Conferenciante: Pablo Raúl Stinga (Iowa State University)

Día: 15 de marzo de 2022

Hora: 11:00h

Lugar: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM y [Google Meet](#)

Organizado por: Instituto de Matemática Interdisciplinar (IMI) y el Departamento de Análisis Matemático y Matemática Aplicada

SEMINARIO DE MATEMÁTICA APLICADA
Pablo Raúl Stinga
Iowa State University
Desigualdad de Harnack para ecuaciones fraccionarias elípticas en forma de no divergencia
Las ecuaciones fraccionarias elípticas en forma de no divergencia aparecen en relación con las ecuaciones de Monge-Ampère fraccionarias, y en aplicaciones a ekuaridatid y hincos. Presentamos la desigualdad de Harnack para soluciones no negativas de ecuaciones dadas por potencias fraccionarias de operadores elípticos en forma de no divergencia. Este es un trabajo conjunto con Mary Vaughan (UT Austin).
Organizado por el Instituto de Matemática Interdisciplinar (IMI) y el Departamento de Análisis Matemático y Matemática Aplicada
Fecha y hora: 15 de Marzo de 2022 a las 11:00h
Lugar: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM
Online: <https://meet.google.com/sde-qprw-qxb>

Seminario de Matemática Aplicada

Título: Nonlocal Aggregation-Diffusion Equations: entropies, gradient flows, phase transitions and applications

Conferenciante: José Antonio Carrillo (University of Oxford)

Día: 16 de marzo de 2022

Hora: 11:00h

Lugar: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM y [Google Meet](#)

Organizado por: Interdisciplinary Mathematics Institute (IMI) , Research Group MOMAT and Department of Applied Mathematics and Mathematical Analysis

SEMINARIO DE MATEMÁTICA APLICADA
Jose Antonio Carrillo
University of Oxford

Nonlocal Aggregation-Diffusion Equations: entropies, gradient flows, phase transitions and applications

This talk will be devoted to an overview of recent results understanding the fluctuation analysis of nonlinear Fokker-Planck equations arising in a variety of applications such as consensus formation, optimization, granular media, reacting behavior, opinion dynamics and financial mathematics to name a few. We will present several results related to localized Cucker-Smale interaction systems, McKendrick-Vlasov equations, and nonlinear diffusion-Segel type models in several settings. We will also discuss the existence of stationary or distribution phase transition on the torus under suitable assumptions on the Fourier modes of the interaction potential. The analysis is based on lower stability in the right function space associated to the regularity of the problem at hand. While in the case of lower diffusion, one can work in the L^2 framework, nonlinear diffusion needs the stronger Sobolev topology to proceed with the analysis based on Csiszar-Robinowitz (Fisherian) analysis applied to the variation of the entropy functional. Explicit examples show that the global bifurcation branches can be very complicated. Stability of the solutions will be discussed based on renormalized divisors with fully explicit energy identity with volume reformulation specifically tailored to the gradient flow structure of these problems. The theoretical analysis of the asymptotic stability of the different branches of solutions is a challenging open problem. This overview talk is based on several works in collaboration with R. Bach, A. Bertoni, J. A. Carrillo, J. Chen, H. Degond, R. Dondoli, J. Du, G. Ponsiglione, A. Schottberg, G. Wang, Z. Wang, and L. Zhang. This research has been funded by EPSRC EP/R01687/1 and ERC Advanced Grant H2020-883363.

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

Date and hour: 16 March 2022, 11:00h
Place: Seminario Alberto Dou (aula 209), Fac. de CC Matemáticas, UCM
Online: <https://meet.google.com/ida-gprvw-qxb>

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

Ángel Manuel Ramos del Olmo, Director del IMI, dará la siguiente conferencia:

Título: Para modelos bellos e interesantes... los matemáticos

Día: 24 de febrero de 2022

Hora: 14:00h

Organizado por: Asociación Proyecto Cometas Divulgación Matemática

Lugar: Aula Miguel de Guzmán, Facultad de Ciencias Matemáticas, UCM



5) 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>