

## **CEDYA / CMA 2024. ROOM 0.2. Martes - Tuesday 25/06/2024**

**S01.** Chair: José Carmona Tapia

10:00 Rubén Fiñana Aránega. *"Influence of a lower order term for the fractional Laplacian BVP in presence of the Hardy potential."*

10:30 Antonio J. Martínez Aparicio. *"Semilinear eigenvalue problems with an unbounded interval of bifurcation points"*

11:00 Miguel Martínez-Teruel. *"Generalized Three Critical Point Theorem for Relativistic Equations with Applications"*

Descanso café / Coffee break

**S01.** Chair: Carlos Gorria

12:10 Eduardo Muñoz-Hernández. *"Global effects of a saturation term in a heterogenous predator-prey model"*

12:35 Juan Carlos Sampedro. *"Blow-up estimates and a priori bounds for the positive solutions of a class of superlinear indefinite elliptic problems"*

13:00 Ralph Showalter. *"Semilinear Degenerate Biot-Signorini System"*

13:25 Francisco De La Hoz. *"A quaternion approach to determine the angle between adjacent sides in the evolution of regular polygons ..."*

Comida / Lunch

**M08.** Chair: Rafael Vázquez

17:00 Cesare Bracco. *"Adaptive isogeometric methods for high-order problems on multipatch geometries"*

17:30 Melina Merkel. *"A tree-cotree gauging method for IGA based on hierarchical B-splines for electromagnetic problems"*

18:00 Gabriele Loli. *"An isogeometric shape optimization method for the dam problem"*

18:30 Nicolò Antonelli. *"Advances in the combination of the Shifted Boundary and the Immersogeometric Analysis"*

## **CEDYA / CMA 2024. ROOM 0.2. Viernes - Friday 28/06/2024**

**M03.** Chair: Arghir Zarnescu

10:30 Claudiu Mindrila. *"Time-periodic solutions for viscous fluids interacting with elastic membranes"*

11:00 Rafael Granero-Belinchón. *"On the free boundary Stokes problem"*

Descanso café / Coffee break

NO SESSION

Comida / Lunch

NO SESSION

## CEDYA / CMA 2024. ROOM 0.3. Lunes - Monday 24/06/2024

NO SESSION

Descanso café / Coffee break

**M10.** Chair: José Manuel Gutiérrez

12:10 Sergio Amat. *"On a nonlinear weighted Chaikin scheme for non smooth data"*

12:35 Alicia Cordero. *"Novel optimal fourth-order methods with perturbed derivatives for solving nonlinear equations with multiplicity"*

13:00 Henar Herrero. *"A posteriori error estimate for a reduced-order model based on Legendre collocation"*

13:25 Víctor Álvarez. *"A numerical experiment with Chebyshev nodes and the monodromy at infinity"*

Comida / Lunch

**M10.** Chair: Sergio Amat

17:00 Jean-Claude Yakoubsohn. *"Matrix decompositions with Newton's method"*

17:25 Juan R. Torregrosa. *"Estimation of the perturbed modes in generalized eigenvalue problems"*

17:50 Juan C. Trillo. *"Golden ratio, silver ratio, plastic ratio and generalizations"*

18:15 José M. Gutiérrez. *"Special critical points and the degree of iteration maps"*

18:40 Miguel Á. Hernández-Verón. *"Using Chebyshev's polynomials to solve integral equations by Newton's method"*

## **CEDYA / CMA 2024. ROOM 0.3. Martes - Tuesday 25/06/2024**

**M15.** Chair: Manuel J. Castro

10:00 Macarena Gómez Mármol. *“One combination of domain decomposition, POD and Neural Network for the numerical resolution of convection...”*

10:25 Enrique Delgado Ávila. *“A POD-Neural Network model for a molten glass flow inside a furnace”*

10:50 Carlos Uriarte. *“Optimizing Variational Physics-Informed Neural Networks Using Least Squares”*

11:15 Salvador Chulián. *“Enhancing prognostic precision in Acute Lymphoblastic Leukemia: a synergy of Topological Data Analysis and Artificial Intel...”*

Descanso café / Coffee break

**M11.** Chair: Agurtzane Amparan

12:10 María del Carmen Quintana. *“The discrete-time para-Hermitian rational eigenvalue problem”*

12:35 Héctor Orera. *“Accurate computations with matrices associated to  $q$ -Jacobi polynomials”*

13:00 José Marín. *“Randomized V-AISM preconditioner”*

13:25 José Mas. *“Approximate Inverse LU preconditioning applied to least squares problems”*

Comida / Lunch

**M11.** Chair: Silvia Marcaida

17:00 Álvaro Samperio. *“Sparse recovery of an electrical network”*

17:30 Pedro R. López-Gómez. *“Well-distributed points on the sphere and the real projective plane”*

18:00 Rafael Bru. *“Combined matrix of diagonally dominant matrices”*

## **CEDYA / CMA 2024. ROOM 0.3. Jueves - Thursday 27/06/2024**

### **M16.** Chair: Iñigo Urteaga

10:00 David Romero. *“Understanding Drug-Target Dynamics through Mathematical Formalism”*

10:25 Pau Reig. *“In-silico simulation of RNA viruses”*

10:50 Andrea Suárez. *“Theoretical Logistics: Distributing Perishable Goods over Long Distances”*

11:15 Josep Sardanyés. *“Modelling Marine Ecosystems for Biodiversity Protection: the case of Oresund strait”*

Descanso café / Coffee break

### **M15.** Chair: Manuel J. Castro

12:10 Andrés Bell Navas. *“Automatic Heart Disease Recognition in Limited Databases of Echocardiograms Improved with Higher Order Dynamic...”*

12:35 Joel Pérez Villarino. *“Imposition of boundary conditions for PINNs in high-dimensional nonlinear parabolic PDEs and applications”*

13:00 Jesús González-Sieiro. *“Reducing the Spatial Discretization Error in Coarse CFD simulations employing deep learning”*

13:25 Rafael Rodríguez Galván. *“Machine learning techniques for inverse problems on brain cell migration in neurogenesis”*

Comida / Lunch

NO SESSION

## **CEDYA / CMA 2024. ROOM 0.3. Viernes - Friday 28/06/2024**

**M12.** Chair: Carlos Vázquez Cendón

10:00 Alejandro López Núñez. *"Pricing American options with endogeneous negative rates under Heston model"*

10:30 Beatriz Gómez Martín. *"Option pricing with Chebyshev-Expanded Artificial Neural Networks"*

11:00 Alvaro Leitao Rodríguez. *"Deep joint learning valuation of Bermudan swaptions"*

Descanso café / Coffee break

**M12.** Chair: Álvaro Leitao Rodríguez

12:10 Jonatan Ráfales Pérez. *"Two-productive sector equilibrium problems with heterogeneous agents under jump-diffusion models"*

12:40 Vera Egorova. *"An ETD-based numerical methods for multidimensional nonlinear pricing models"*

13:10 Carlos Vázquez Cendón. *"Models and numerical methods for XVA pricing in multicurrency derivatives."*

Comida / Lunch

NO SESSION

## **CEDYA / CMA 2024. ROOM 0.4. Martes - Tuesday 25/06/2024**

**M01.** Chair: Pedro J. Martínez Aparicio

10:00 José Sabina. *"Perturbation of the Robin eigenvalues of the  $p$ -Laplacian operator"*

10:25 Willian Cintra. *"Asymptotic behavior of positive solutions for a degenerate logistic equation with mixed local and non-local diffusion"*

**M01.** Chair: Alexis Molino Salas

10:50 Javier Cueto. *"Helmholtz decomposition based on nonlocal gradients over bounded domains"*

11:15 Sergio Segura de León. *"Existence for quasilinear elliptic equations involving asymptotic linear growth operators"*

Descanso café / Coffee break

**M04.** Chair: Miguel Martínez Teruel

12:10 José Carmona Tapia. *"Nonexistence of nontrivial solutions to Dirichlet problems for the fractional Laplacian"*

12:35 Pedro Jesús Martínez Aparicio. *"Unexpected phenomena for an elliptic equation involving the divergence of a singular term"*

13:00 Alexis Molino Salas. *"Neumann problem for a class of doubly equations for the 1-Laplacian"*

13:25 Salvador Villegas Barranco. *"Lower bounds for Dirichlet energy of entire stable solutions"*

Comida / Lunch

**M15.** Chair: Macarena Gómez Mármol

17:00 Ávila León Miguel. *"Neural Network based Finite Volume Methods for 1D hyperbolic conservation laws"*

17:30 Miriam Esteve. *"Trajectory Classification through Topological Data Analysis: A Study on Simulated and Real-World Datasets"*

18:00 Andrés Prieto. *"Data-driven characterization of viscoelastic materials using time-harmonic hydroacoustic measurements"*

18:30 Juan Francisco Rodríguez. *"Spanish Tsunami Early Warning System: Enhancing Maximum Wave Height Predictions via Neural Networks"*

## **CEDYA / CMA 2024. ROOM 0.4. Jueves - Thursday 27/06/2024**

**M02.** Chair: Rafael López Soriano

10:00 María Medina. *“High-energy solutions to critical competitive systems in dimensions 3 and 4”*

10:30 Aleks Jevnikar. *“Existence results for super-Liouville systems”*

11:00 Francesco Esposito. *“On the classification of solutions for Hardy-Sobolev doubly critical systems”*

Descanso café / Coffee break

**M02.** Chair: María Medina

12:10 Alejandro Ortega. *“Nonlinear fractional Schrödinger equations coupled by power-type nonlinearities”*

12:40 Martina Magliocca. *“New functional inequalities with applications to the Arctan-Fast Diffusion Equation”*

13:10 Ángel Arroyo. *“Doubly critical elliptic systems”*

Comida / Lunch

**M02.** Chair: Alejandro Ortega

17:00 Laura Baldelli. *“A priori estimates for quasilinear elliptic systems”*

17:30 Domenico Vuono. *“Regularity and symmetry results for the vectorial  $p$ -Laplacian”*

18:00 Luigi Muglia. *“Optimal second order boundary regularity for solution to  $p$ -Laplace problems”*

18:30 Alejandro Gárriz. *“A Hamilton-Jacobi approach for the evolutionary dynamics of a model with gene transfer. How to characterize ...”*



## **CEDYA / CMA 2024. ROOM 0.4. Viernes - Friday 28/06/2024**

**S08.** Chair: José Manuel Ramón

10:00 Luis Floría. "On an Approximate Analytical Solution to a Problem of Radzievskij"

10:30 Inmaculada Garces. "Subdivision schemes based on robust regression"

11:00 Andreu Martorell. "Graph diffusion for improving nodal feature classification"

Descanso café / Coffee break

**S08.** Chair: Inmaculada Garcés

12:10 Jose Manuel Ramon. "Non-linear Moving Least Squares method and applications"

12:40 Dionisio Yanez. "Non-linear Partition of Unity method"

Comida / Lunch

NO SESSION

## **CEDYA / CMA 2024. ROOM 0.5. Lunes - Monday 24/06/2024**

NO SESSION

Descanso café / Coffee break

**M05.** Chair: Óscar Rodríguez

12:10 José Lamas. *“Collision leading to chaos in the Restricted Planar 3-Body Problem”*

12:35 Begoña Nicolás. *“Dynamical study of a family of asteroids”*

13:00 Jesús Dueñas. *“Nonautonomous mathematical modeling of the Allee effect: from bifurcations to critical transitions”*

13:25 Eduardo Muñoz-Hernández. *“Analysis of some periodic problems via topological methods”*

Comida / Lunch

**M05.** Chair: Begoña Nicolás

17:00 Miquel Barcelona. *“On the structure of the sets of heteroclinic connections between libration points and some applications”*

17:30 Óscar Rodríguez. *“Exponential small splitting of separatrices in a molecular model”*

18:00 Román Moreno. *“Heteroclinic connections in a generalized Arnold model”*

18:30 Rubén Caballero. *“About non-local reaction-diffusion equations”*

## **CEDYA / CMA 2024. ROOM 0.5. Martes - Tuesday 25/06/2024**

**M06.** Chair: Rafael Obaya

10:00 Ulrike Feudel. *“Critical transitions in complex systems: the role of timescales and unstable states”*

10:25 Carmen Núñez. *“Critical transitions for asymptotically concave ordinary differential equations”*

10:50 Ana María Sanz. *“Tracking nonautonomous attractors in slow-fast systems of ODEs with dependence on the fast time”*

11:15 Joan Carles Tatjer. *“Existence of strange non-chaotic attractors in a quasi-periodically forced piecewise-linear map”*

Descanso café / Coffee break

**M06.** Chair: Jesús Dueñas

12:10 Iacopo P. Longo. *“Global bifurcations of homoclinic solutions for nonautonomous ordinary differential equations”*

12:35 Juan García-Fuentes. *“Transition between forward attractors for a non-autonomous Lotka-Volterra system”*

13:00 Samuel Jelbart. *“Critical transitions in asymptotically slow-fast systems”*

13:25 Fátima Drubi. *“Chaotic dynamics in coupled systems: some 4-dimensional models”*

Comida / Lunch

**S02.** Chair: Daniel Pérez-Palau

17:00 Edgar Alejandro Antonio Martínez. *“On the regularity of solutions to a slightly subcritical Neumann problem”*

17:30 Imanol García-Beristain. *“A GENERIC guided approach to learning entropy-based constitutive equations for polymeric liquids using PINNs”*

18:00 Iván León Merino. *“How higher-order interactions modify the synchronization transitions”*

18:30 Felipe Ponce-Vanegas. *“Semi-Analytical Solutions for Systems with Slowly Varying Parameters”*

## **CEDYA / CMA 2024. ROOM 0.5. Jueves - Thursday 27/06/2024**

**M03.** Chair: David Lannes

10:00 Luis Vega. *"The binormal flow and the evolution of viscous vortex filaments"*

10:30 Danica Basarić. *"On a blow-up criterion for the Navier-Stokes-Fourier system"*

11:00 Imène Djebour. *"Existence of strong solutions for a compressible fluid-solid interaction system with Navier slip boundary conditions"*

Descanso café / Coffee break

**M03.** Chair: Luis Vega

12:10 David Lannes. *"Wave-structure interactions"*

12:40 Fabian Bleitner. *"Scaling laws for Rayleigh-Bénard convection with Navier-slip boundary conditions"*

13:10 Elena Salguero. *"Global in time solutions for the two-phase gravity Stokes flow"*

Comida / Lunch

**M03.** Chair: Francesco Fanelli

17:00 Diego A. Souza. *"On the control of some PDEs from fluid mechanics"*

17:30 Diego Alonso-Orán. *"Boundary value problems arising in magneto-hydrodynamics"*

18:00 Martina Magliocca. *"Global existence for certain fourth order evolution equations"*

18:30 Jon Asier Bárcena. *"Exact controllability to the trajectories of the one-phase Stefan problem"*

## **CEDYA / CMA 2024. ROOM 0.5. Viernes - Friday 28/06/2024**

**M09.** Chair: Carmen Rodrigo

10:00 Markus Bause. *“Geometric multigrid for local space-time FEM to 3d Navier-Stokes and dynamic Biot systems”*

10:25 Xiaozhe Hu. *“Robust preconditioners for multiphysics problems”*

10:50 Ana Clara Ordoñez Egas. *“Parallel performance of preconditioners for mechanics with a second gradient regularization problems”*

11:15 Javier Zaratiegui. *“Multipoint Flux Finite Element Methods for the Dual-Porosity Darcy Flow Model and Their Efficient Multigrid Solution”*

Descanso café / Coffee break

**M09.** Chair: Álvaro Pé de la Riva

12:10 Carmen Rodrigo. *“Iterative coupling solution of a novel stabilization scheme for Biot's model”*

12:35 El Mehdi Ettaouchi. *“Nonlinear Schwarz Domain Decomposition Solvers for Two-Phase Flow in Porous Media”*

13:00 Iñigo Jiménez Ciga. *“Second-order space-time parallel methods for diffusion-dominated problems and extension to reaction-diffusion problems”*

13:25 Jesika Maganin. *“Efficient, robust and accurate method for simulating a tumor growth model”*

Comida / Lunch

NO SESSION

## **CEDYA / CMA 2024. ROOM 0.6. Martes - Tuesday 25/06/2024**

**S03.** Chair: José Ramón Fernández

10:00 Carlos Arranz-Simón. *“Rational methods for abstract evolution problems without order reduction”*

10:25 Alejandro Bandera. *“Intrinsic Proper Generalized Decomposition modes of parametric symmetric elliptic problems on Grassmann manifolds”*

10:50 Noelia Bazarra. *“Analysis of a Mathematical Model Arising in Plant Disease Epidemiology”*

11:15 Víctor Domínguez. *“Combining BEM-FEM and CQ Techniques for Wave Propagation Simulation”*

Descanso café / Coffee break

**S03.** Chair: María González Taboada

12:10 José Ramón Fernández. *“Numerical analysis of a thermoelastic problem of Moore-Gibson-Thompson type with history dependence”*

12:35 Irina Raichik. *“A numerical method to solve Maxwell's equations in singular 3D geometry”*

13:00 Paula López. *“A Partition of Unity Finite Element Method for acoustic wave propagation problems in layered media”*

13:25 M. Carmen Martí. *“WENO scheme on characteristics for the equilibrium dispersive model of chromatography with generalized Langmuir iso...”*

Comida / Lunch

**S03.** Chair: Noelia Bazarra

17:00 María González Taboada. *“Residual-based a posteriori error indicator for a dual-mixed method for the Darcy-Forchheimer model”*

17:25 Jerónimo Rodríguez. *“RK integrators for the DG discretization of linear Friedrichs systems”*

17:50 Ignacio Roldán Bocanegra. *“Numerical Methods of Second Order for Stochastic Differential Equations”*

18:15 Isabel Sánchez. *“Numerical approximation of PGD modes to parameterized elliptic problems”*

18:40 Virginia Selgas. *“A Trefftz discontinuous Galerkin method for the acoustic scattering in a waveguide”*

## **CEDYA / CMA 2024. ROOM 0.6. Jueves - Thursday 27/06/2024**

**M07.** Chair: Elena Gaburro

10:00 Laura Saavedra. *“Invariant domain method for solving Lagrangian Hydrodynamics equations”*

10:25 Víctor González Tabernero. *“Well-balanced LDG numerical schemes for two-dimensional shallow-water systems with Coriolis terms”*

10:50 Pablo Solán Fustero. *“POD-based reduced-order modelling applied to parametrized hyperbolic problems”*

11:15 Gwendal Léger. *“Submarine avalanches modelling with two coordinates multilayer system”*

Descanso café / Coffee break

**M07.** Chair: José Garres

12:10 Elena Gaburro. *“Quasi-conservative discontinuous Galerkin schemes for hyperbolic systems in non-conservative variables with subcell finite ...”*

12:30 Pep Mulet Mestre. *“Numerical schemes for the compressible Cahn-Hilliard-Navier-Stokes equations”*

12:50 Irene Gómez Bueno. *“Well-balanced reduced order models based on POD for hyperbolic systems of balance laws”*

13:10 Jorge Moya. *“Layer-averaged models for bedload and suspension sediment transport with erosion and deposition effects”*

13:30 Celia Caballero Cárdenas. *“Semi-implicit fully exactly well-balanced schemes for shallow flows”*

Comida / Lunch

**M07.** Chair: Tomás Morales

17:00 Ralph Lteif. *“A High order ImEx method for the shallow water model”*

17:20 Ernesto Pimentel García. *“High-order fully well-balanced numerical methods for one-dimensional blood flow with discontinuous properties...”*

17:40 Cipriano Escalante Sánchez. *“A relaxed hyperbolic approach for non-hydrostatic shallow water models”*

18:00 Enrique D. Fernández Nieto. *“A hierarchy of debris flows models with dilatancy effects”*

18:20 Manuel Castro Díaz. *“Robustness and entropy inequalities through artificial viscosity”*

18:40 Arturo Hidalgo. *“TBA”*

## **CEDYA / CMA 2024. ROOM 0.7. Lunes - Monday 24/06/2024**

NO SESSION

Descanso café / Coffee break

NO SESSION

Comida / Lunch

**M14.** Chair: Samuele Rubino

17:00 María Cruz Navarro. *“Temperature optimization in a gas reactor for the synthesis of carbon nanofibers: A numerical approach”*

17:30 Ander García. *“Analyzing pedestrian density at football stadium entrances”*

18:00 David González-Peñas. *“Improving Resistance Furnace Operation in Purification Processes: Findings from Mathematical Modeling and...”*

18:30 Mohsen Shabani. *“Modelling, numerical simulation, and optimization of new technologies related to hydrogen production (Zeppelin project)”*



## **CEDYA / CMA 2024. ROOM 0.7. Martes - Tuesday 25/06/2024**

**M14.** Chair: David González-Peñas

10:00 Sergio Muñoz. *“New inspection method of welding joints in the field of defense engineering”*

10:25 Angel Manuel Ramos. *“Mathematical modeling of oil spills”*

10:50 Kanika Rajain. *“High-quality smooth finishing of blade-like geometries through G1 multi-pass 5-axis flank CNC Machining with conical cutting...”*

11:15 Samuele Rubino. *“Hybrid RANS turbulence Reduced Order Models for Heat Transfer Fluid”*

Descanso café / Coffee break

**S06.** Chair: Benjamín Ivorra

12:10 Amanda Carreño. *“An updated proper orthogonal decomposition to approximate the time-dependent neutron diffusion equation”*

12:40 Marina Echeverria. *“Mesoscale Modelling of Thrombus Formation using smoothed Dissipative Particle Dynamics”*

13:10 Benjamin Ivorra. *“Enhancing N-PERT Solar Cells under the Atacama Desert Solar Spectrum”*

Comida / Lunch

**S06.** Chair: Amanda Carreño

17:00 Alicja Kubik. *“Identifiability and observability for a class of epidemiological models”*

17:30 Daniela Moreno. *“Numerical modelling of Enveloped Virus Hydrodynamics”*

18:00 Nicolás Moreno. *“Investigation on the disaggregation mechanisms of red-blood-cells”*

## **CEDYA / CMA 2024. ROOM 0.7. Jueves - Thursday 27/06/2024**

**M13.** Chair: Tim Myers

10:00 María Agualeles. *“Tuning adsorption columns' porosity to improve efficiency”*

10:25 Joan Anglada. *“Travelling waves in adsorption processes”*

10:50 Francesc Font. *“3D simulations of gas transport in porous media with adsorption and comparison to 1D models”*

11:15 Marc Calvo-Schwarzwälder. *“Removal of multiple contaminants using column sorption”*

Descanso café / Coffee break

**M13.** Chair: María Agualeles

12:10 Tim Myers. *“On the removal of large quantities of contaminant via column sorption”*

12:35 Cristian Moreno-Pulido. *“Modelling and experiments on hydrogen storage in metal hydrides”*

13:00 Abel Valverde. *“Optimisation of adsorption column processes: the role of adsorbent microstructure and its packing arrangement”*

13:25 Lucy Auton. *“The effect of microstructure on macroscopic contaminant transport and removal in the dispersive limit”*

Comida / Lunch

**S02.** Chair: Felipe Ponce-Vanegas

17:00 Daniel Pérez-Palau. *“The Plutonian Moons and its dynamics”*

17:30 Luke Shaw. *“Generalized extrapolation methods based on compositions of a 2nd order scheme”*

18:00 Dmitry Sinelshchikov. *“Integrability criteria for nonlinear oscillators and superintegrable geodesic flows”*

18:30 Iñigo Urteaga. *“Data-assimilation meets automatic differentiation for identification of dynamical systems from irregularly-sampled, noisy data”*

## **CEDYA / CMA 2024. ROOM 0.7. Viernes - Friday 28/06/2024**

**S05.** Chair: Virginia Muto

10:00 Antoni Bancells. “Model identification in diathermy based on skin temperature”

10:30 Jon Asier Bárcena Petisco. “Observability and control of parabolic equations on networks with loops”

11:00 Manuel Pena. “Testing multi-frequency linear sampling indicators on experimental data”

Descanso café / Coffee break

**S05.** Chair: Antoni Bancells

12:10 Claudiu Placinta. “Application of topological derivative methods to non-destructive inspection of metallic plate”

12:40 María Luisa Rapún. “Combining dynamic modes and topological sensitives for active thermographic inspection”

13:10 Iago Padín. “Stochastic control with state constraints of a photovoltaic plant with batteries”

Comida / Lunch

NO SESSION