



**XXIV Simposio Internacional de Métodos Matemáticos Aplicados a las Ciencias**  
**XXIV International Symposium on Mathematical Methods Applied to Sciences**



**XXIV SIMMAC Martes / Tuesday 20th**

Room 1				Room 2				Room 3				Room 4			
8:00 --> Inscripciones / Inscription															
9:30 10:00 Inauguración / Opening ceremony															
10:00 10:30 Café / Coffee break															
11:00 12:00 <b>Opening Plenary Talk / Conferencia Inaugural</b>															
Chou, Shu Wei															
<b>Modelos lineales parciales aditivos con error simétrico autorregresivo para datos de series temporales</b>															
Chair: <i>Javier Trejos</i>															
12:00 13:30 Tiempo para almuerzo / Time for lunch.															
Room 1				Room 2				Room 3				Room 4			
Session Chair:	<b>EstM1 Estadística Multivariada / Multivariate Statistics 1</b> Greivin Hernández			Session Chair:	<b>Fis1 Física / Physics 1</b> <i>Francisco Frutos</i>			Session Chair:	<b>TC1 Teoría de Control / Control Theory</b> <i>Javier Trejos</i>			Session Chair:	<b>EIF1 Métodos de Elementos Finitos / Finite Element Methods</b> Juan Gabriel Calvo		
1	13:30	14:00	Diaz, Arturo J. Multivariate Control Chart with Guaranteed IC performance and Cautious Parameter Learning	4	13:30	14:00	Barquero, Joshi First magnetohydrodynamic simulations of jets and radiative feedback from a massive star	7	13:30	14:00	<del>Fournier, Arnaud Boundary null controllability of convection-diffusion equations with constraints on the state and application to the identification</del>	10	13:30	14:00	Quiroz, Darwi Local discontinuous Galerkin method with linearly implicit IMEX-RK time discretizations for the numerical solution of
2	14:00	14:30	Vazquez, Hécl Estudio de asociación entre la forma biológica de hojas de árboles y aspectos genéticos de la especie	5	14:00	14:30	Mora, Alexandre An approximate model and computations for the orbits around a non rotating compact object with mass and magnetic	8	14:00	14:30	Vides, Fredy Switched economic system dynamics identification using topologically controlled reservoir computers	11	14:00	14:30	Colmenares, E Analyzing Bioconvection: An Application of Banach-Based Mixed Finite Element Methods
3	14:30	15:00	Gomez-Rodríguez The Effects of Economic Shocks on Heterogeneous Inflation Expectations	6	14:30	15:00	Solano, Diego F Equatorial circular motion in a Kerr-like spacetime	9	14:30	15:00	#N/D	12	14:30	15:00	Careaga, Julio Banach spaces-based mixed finite element methods for a model of poroelasticity coupled with the heat equation
15:00 15:30 Café / Coffee break															
<b>Cambio: Álgebra Lineal Numérica</b>				Session Chair:				Session Chair:				Session Chair:			
				<b>Fis2 Física / Physics 2</b> <i>Francisco Frutos</i>				<b>Alg1 Álgebra / Algebra - Tutorial</b> <i>Adriana Sánchez</i>				<b>AlgNu: Álgebra Lineal Numérica / Numerical Linear Algebra</b> Juan Gabriel Calvo			
<b>Aula 1</b>				13	15:30	16:00	González, Amy Holography and Mathematics	15	15:30	16:00	Extensions of infinite dimensional modules	17	15:30	16:00	<del>Soto, Juan-Pal Approximating a bivariate function using (jit B-splines) and the matrix equation <math>SAXB=CS</math>.</del>
<b>Switch: Linear numerical algebra</b>				14	16:00	16:30	Macias, Jorge S On the solution of some elliptic systems of partial differential equations of the Schrödinger type	16	16:00	16:30	Lopez-Permouth based on amenable bases and related topics	18	16:00	16:30	Sánchez, Sam A new approach for estimating the pseudoinverse of a third-order tensor and its application in image processing
<b>Room 1</b>				16:30	17:00			16:30	17:00			19	16:30	17:00	<del>Soto-Quirós, E Expanding the Utility of Singular Value Decomposition in Image Processing: Novel Applications and Techniques</del>



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**XXII SIMMAC: Miércoles / Wednesday 21th**

Room 1				Room 2				Room 3				Room 4			
Session <b>SD1</b> <b>Sistemas Dinámicos y Teoría Ergódica / Dynamical Systems</b> Chair: Adriana Sánchez				Session <b>GT1</b> <b>Topología y Geometría / Geometry and Topology 1</b> Chair: Ronald Zúñiga											
20 09:00 09:30				23 09:00 09:30 Rubinstein, Yanir Mahler's and Bourgain's conjectures viewed through complex geometry											
21 09:30 10:00 Funeza, William Complexity in Networks of Piecewise Contractive Transformations				24 09:30 10:00 Schmitt, Alezande Compactifications of the moduli space of principal bundles on smooth curves											
22 10:00 10:30 Méndez, Hécto Productos sesgados caóticos y operadores de convolución				25 10:00 10:30 Oliveira, André Lie algebroid connections degenerating onto twisted Higgs bundles											
10:30 11:00 Café / Coffee break															
Session <b>EstC1</b> <b>Estadística Computacional / Statistical Computing</b> Chair: Javier Trejos				Session <b>SD2</b> <b>Sistemas Dinámicos y Teoría Ergódica / Dynamical Systems</b> Chair: Adriana Sánchez				Session <b>GT2</b> <b>Topología y Geometría / Geometry and Topology 2</b> Chair: Ronald Zúñiga				Session <b>Biom1</b> <b>Matemática Biológica / Biomathematics 1</b> Chair: Jennifer Loria			
26 11:00 11:30 Rengifo, Camilo A robust methodology for incomplete information in tables to two classification ways				28 11:00 11:30 Salgado, Lucian Sensitivity and historic behavior for continuous maps				30 11:00 11:30 Collier, Brian Higgs bundles and complex hyperbolic structures on disk bundles				32 11:00 11:30 Alvarez, Ernest The Closest Tree Algorithm for Explaining Ancestral Data			
27 11:30 12:00 Duarte, Robert Comparación de estimadores robustos para los parámetros de una distribución Beta.				29 11:30 12:00 Marchesin, Mar A Family of Linear Stable Equilibria in the Sun-Earth-Sail Problem				31 11:30 12:00 Brambila-Paz, Let Twisted Brill-Noether Theory				33 11:30 12:00 Sanchez, Fabio A nonlinear relapse model with disaggregated contact rates: analysis of a forward-backward bifurcation			
12:00 13:30 Tiempo para almuerzo / Time for lunch.															
Room 1				Room 2				Room 3				Room 4			
Session <b>DSc1</b> <b>Ciencia de Datos / Data Science 1</b> Chair: Luis Amaya				Session <b>MNPD</b> <b>Métodos Numéricos para PDEs / Numerical Methods for PDEs</b> Chair: Juan Gabriel Calvo				Session <b>Alg1</b> <b>Álgebra / Algebra - Tutorial</b> Chair: Alg1				Session <b>Mod1</b> <b>Modelación Matemática / Mathematical Modeling 1</b> Chair: Alexander Ramirez			
34 13:30 14:00 Trejos, Javier Multidimensional scaling by particle swarm optimization				37 13:30 14:00 Sequeira, Filánc New Banach spaces-based fully-mixed finite element methods for pseudostress-assisted diffusion problems				40 13:30 14:00 Lopez-Permouth, Extensions of infinite dimensional modules based on amenable bases and related topics				43 13:30 14:00 Arteaga, Jose R Introduction to Mathematical Models Applied to Medicine			
35 14:00 14:30 Gallardo, Eugen Aspectos relacionados con la permanencia y la graduación del estudiantado: el caso de la Escuela de Estadística de la Universidad				38 14:00 14:30 Macias-Díaz, Jo On the numerical solution of the fractional Fermi-Pasta-Ulam-Tsingou equation				41 14:00 14:30 Chicas, Gabriel Al Some properties of Morava's group of extensions				44 14:00 14:30 Cardona, Kerin Identification of Dynamical Systems: An Integrated Approach Based on Sparsity, Regularization and Low Rank			
36 14:30 15:00 Beltrán, Beatriz Análisis de sentimientos con PLN para el problema de deserción escolar en nivel universitario				39 14:30 15:00 Solano, Manuel A dissimilar mesh discretization for hybridizable discontinuous Galerkin schemes applied to interface problems											
15:00 15:30 Café / Coffee break															
<b>Poster session / sesión de carteles</b>															
Session <b>DSc2</b> <b>Ciencia de Datos / Data Science 2</b> Chair: Javier Trejos				Session <b>ElFi2</b> <b>Métodos de Elementos Finitos / Finite Element Methods</b> Chair: Elfi2				Session <b>Ana1</b> <b>Análisis y Probabilidad / Analysis and Probability</b> Chair: Dario Mena				Session <b>Mod1</b> <b>Modelación Matemática / Mathematical Modeling 1</b> Chair: Alexander Ramirez			
46 15:30 16:00 Funez, William Analysis of the forced propensity to migrate in Honduras using machine learning methods				49 15:30 16:00 Sanchez, Manu New symplectic discontinuous Galerkin methods for Maxwell Equations				52 15:30 16:00 Mendoza-Torres, Improper Integration and Fourier Analysis				55 15:30 16:00 Arteaga, Jose Introduction to Mathematical Models Applied to Medicine			
47 16:00 16:30 Berlioz, Luis Text mining the arXiv with LLMs				50 16:00 16:30				53 16:00 16:30 Arredondo, Juan An example of fractality in the theory of integration				56 16:00 16:30 Ricardo Continuous Time Modeling with Criminological Panel Data: An Application to the Longitudinal Association between			
48 16:30 17:00 Rueda, María d Inference from non-probabilistic surveys through data integration				51 16:30 17:00				54 16:30 17:00 Bonnini, Stefano Comparative longitudinal analysis of hormonal concentrations and morphometric measurements between				57 16:30 17:00 Reinecke, Jost			



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XXIV SIMMAC: Jueves/Thursday 22

Cambio: Aula 2 Room 1 Switch Room 2		Cambio: Aula 1 Room 2 Switch Room 1		Room 3		Room 4			
Session Chair: DSc3 Ciencia de Datos / Data Science - Tutorial 1 Adriana Sánchez	Session Chair: MEst1 Modelos Estadísticos / Statistical Modeling 1 Shu Wei	Session Chair: Anal2 Análisis y Probabilidad / Analysis and Probability Dario Mena	Session Chair: Biom2 Matemática Biológica / Biomathematics 2 Greivin Hernández						
58 09:00 09:30	61 09:00 09:30 Solis, Maikol Machine Learning-Driven COVID-19 Early Triage and Large-Scale Testing Strategies Based on the	64 09:00 09:30 Cambronero, Sa On the supremum of a family of set functions	67 09:00 09:30 Villalobos, Mari Curve Fitting for pandemic data using Generalized Logistic Regression						
59 09:30 10:00 Alfaro, Marcela Análisis de Datos Reproducible con R	62 09:30 10:00 Macías, Néstor Effect of social food modeling with healthy virtual models on school-age children's selection of	65 09:30 10:00 Campos, José D Quadratic variation for cylindrical martingale-valued measures	68 09:30 10:00 López-Estrada, J Early unveiling of coronary stenosis by no invasive mean						
60 10:00 10:30	63 10:00 10:30 López, Erasmo Prevalence of cardiometabolic risk in a national sample of Costa Rican youth using the waist-	66 10:00 10:30 Fonseca-Mora, Stochastic integration with respect to infinite dimensional semimartingales	69 10:00 10:30 Loria, Jennifer Vaccine Efficacy Estimation Quantified by a Mathematical Model.						
10:30 11:00 Café / Coffee break									
11:00 12:00 Plenary Talk 2 / Conferencia plenaria 2									
Harris, Pamela									
Secuencias multicomplejas de malabares y la función de partición de Kostant									
Chair: Adriana Sánchez									
12:00 13:30 Tiempo para almuerzo / Time for lunch.									
Cambio: Aula 2 Room 1 Switch Room 2		Cambio: Aula 1 Room 2 Switch Room 1		Room 3		Room 4		Room 5	
Session Chair: DSc4 Ciencia de Datos / Data Science - Tutorial 2 Adriana Sánchez	Session Chair: MNPD: Métodos Numéricos para PDEs / Numerical Meth Juan Gabriel Calvo	Session Chair: Riesgo Riesgo / Risk Alvaro Guevara	Session Chair: Mod1 Modelación Matemática / Mathematical Modeling 1 Alexander Ramírez						
70 13:30 14:00	73 13:30 14:00 Gómez, Bryan A Twofold saddle-point formulation of Biot poroelasticity with stress-dependent diffusion	76 13:30 14:00 Rangel, Jennifer Más allá de los gráficos: Explorando las matemáticas en el Algorithmic Trading.	79 13:30 14:00						
71 14:00 14:30 Villegas-Díaz, RcAPI development with R	74 14:00 14:30 Muñoz, Roland Numerical analysis of the Davey-Stewartson system	77 14:00 14:30 Schubert, Leo Risk limitation in portfolio optimization	80 14:00 14:30 Arteaga, Jose R Introduction to Mathematical Models Applied to Medicine						
72 14:30 15:00	75 14:30 15:00 Medina, Iliana E Optimizing the bio-activity of magnetic nanomaterials (MNM) in hyperthermia cancer	78 14:30 15:00 Quirós, Tatiana Transformando la banca con Machine Learning: Score de crédito para PYMES	81 14:30 15:00 Segura, Esteban Transformando la banca con Machine Learning: Score de crédito para PYMES						
15:00 15:30 Café / Coffee break Room 1		Room 2							
Session Chair: DSc5 Ciencia de Datos / Data Science 5 Alexander Ramírez	Session Chair: Comp1 Computación Científica / Scientific computing Juan Gabriel Calvo	Session Chair: Alg1 Álgebra / Algebra - Tutorial Dario Mena	Session Chair: Opt1 Optimización / Optimization Mario Villalobos	Session Chair: Mesa redonda Mujeres en Matemática / Samaria Montenegro					
82 15:30 16:00 Amaya-Briceño, Classification of Guanacaste districts using free access geospatial data.	85 15:30 16:00 Delgado, Alejan Measuring, Simulation and Evaluation of Room Impulse Responses Associated with	88 15:30 16:00 Extensions of infinite dimensional modules based on amenable bases and related topics	91 15:30 16:00 Ramírez, Javier Constraint Satisfaction Method in Natural Language Processing Problems	15:30 16:00					
83 16:00 16:30 Hernández, Edg Quantifying uncertainty of a geometric goodness of fit measure.	86 16:00 16:30 Fallas-Monge, J FromPro Toolbox: Aplicaciones de la norma de Frobenius en el procesamiento de imágenes y	89 16:00 16:30 Lopez-Permoutt	92 16:00 16:30 Weng-Law, And Accelerated methods for nonsmooth convex structured minimization problems	16:00 16:30 Montenegro, Samaria					Mesa redonda Mujeres en Matemática / Women in Mathematics Roundtable
84 16:30 17:00	87 16:30 17:00	90	93 16:30 17:00 Hernández, Ferr Algorithms, efficient implementations, and their utility in the industry: Generalized	16:30 17:00					



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**XXII SIMMAC Viernes / Friday 23th**

Cambio: Aula 2 Room 1 Switch Room 2		Cambio: Aula 1 Room 2 Switch Room 1		Room 3		Room 4	
Session Chair	<b>DSc3</b> Ciencia de Datos / Data Science - Tutorial 1 Adriana Sánchez	Session Chair	<b>MEst2</b> Modelos Estadísticos / Statistical Modeling 2 Shu Wei			Session Chair	<b>TN1</b> Teoría de números y combinatoria / Number Theory and Dario Mena
94	09:00 09:30	97	09:00 09:30 Hidalgo, Hugo G. Regional and local trend significance of precipitation and temperature extremes in Central America: the			100	09:00 09:30 Camacho, Catalina Cartier points of genus 3 and 4 curves
95	09:30 10:00 Alfaro, Marcela Análisis de Datos Reproducible con R	98	09:30 10:00 Canales, Eduardo S Bayesian multi-level modeling for the touristic expenditure in Honduras.			101	09:30 10:00 Barquero, Adrián A Efficient computation of the overpartition function and applications
96	10:00 10:30	99	10:00 10:30 Alfaro, Eric Jose Uso de herramientas estadísticas para la generación de escenarios climáticos en la vertiente Caribe de			102	10:00 10:30 Lacy, Allan Dynatomic Galois groups for a family of quadratic rational maps
10:30 11:00 Café / Coffee break							
11:00 12:00 <b>Plenary Talk 3 / Conferencia plenaria 3</b> Villar, Soledad  <b>Simetrías en inteligencia artificial</b>  Chair: <i>Alexander Ramírez</i>							
12:00 2:00 Tiempo para almuerzo / Time for lunch.							
Cambio: Aula 2 Room 1 Switch Room 2		Cambio: Aula 1 Room 2 Switch Room 1		Room 3		Room 4	
Session Chair	<b>DSc4</b> Ciencia de Datos / Data Science - Tutorial 2 Adriana Sánchez	Session Chair	<b>Riesgo</b> Mesa redonda Riesgo / Risk Roundtable Alvaro Guevara	Session Chair	<b>MNPD</b> Métodos Numéricos para PDEs / Numerical Methods for Chair-MNPD3	Session Chair	<b>TN2</b> Teoría de números y combinatoria / Number Theory and Dario Mena
103	13:30 14:00	106	13:30 14:00	109	13:30 14:00	112	13:30 14:00 Piza, Eduardo Balanced Incomplete Block Designs: theory and computer search
104	14:00 14:30 Villegas-Diaz, Rober API development with R	107	14:00 14:30 Guevara, Alvaro Mesa redonda Riesgo / Risk Roundtable	110	14:00 14:30 Salazar, Jorge Luis Non-blanced finite finite differences and adaptive gradient optimizers: an application to full waveform seismic	113	14:00 14:30
105	14:30 15:00	108	14:30 15:00	111	14:30 15:00 Calvo, Juan Gabriel Robust domain decomposition methods for highcontrast multiscale problems on irregular domains	114	14:30 15:00
15:00 15:30 Café / Coffee break							
15:30 16:30 <b>Closing Plenary Talk / Conferencia de Clausura</b> Ramírez, Kattia  <b>To be announce</b>  Chair: <i>Adriana Sánchez</i>							
16:30 Clausura / Closing session							