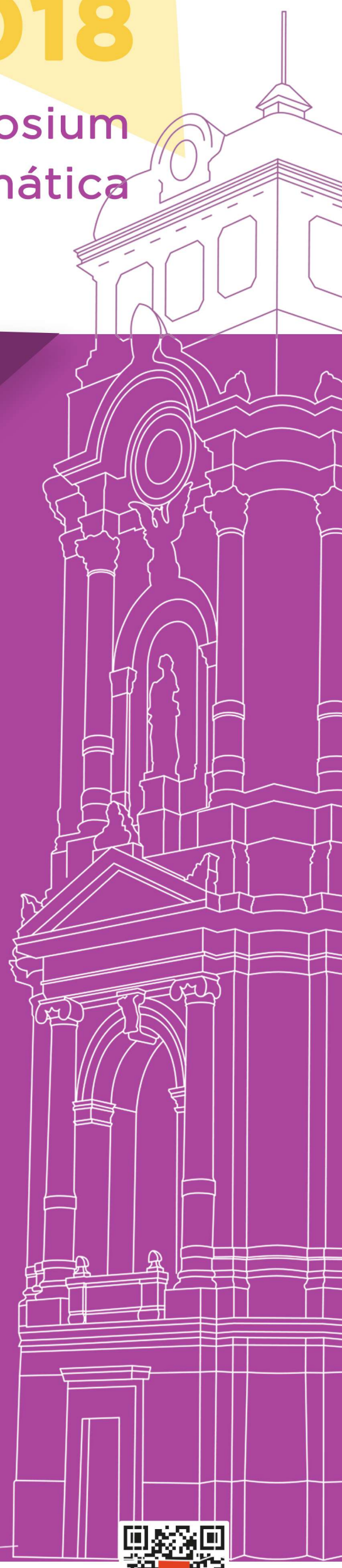
UAEH
Universidad Autónoma del Estado de Hidalgo

AyFM

Otoño 2018

XIV Simposium Análisis y Física Matemática



29 y 30 noviembre 2018

HORA: **10:00 h**

LUGAR: Sala de usos múltiples del **Área Académica de Matemáticas y Fisica**

CONFERENCISTAS:

Cynthia Flores (California State University)
Carlos Islas (Universidad Autónoma de la Ciudad de México)
Felipe Contreras (Universidad Autónoma de la Ciudad de México)
Francisco Torres Ayala (Universidad Nacional Autónoma de México)
Luis Alberto Quezada (Universidad Autónoma Metropolitana)

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XIV Simposium Análisis y Física Matemática

A y F M Otoño 2018

Sala de usos múltiples, MF2 · 29 y 30 de Noviembre · AAMyF · UAEH · México

	jueves	viernes
Hora / Día	noviembre 29	noviembre 30
9:50 - 10	*Inauguración*	
10 - 10:55	Cynthia Flores CSUCI *EDPs no lineaes y dispersivas*	Cynthia Flores CSUCI *EDPs no lineales y dispersivas*
11 - 11:20	*café*	*café*
11:20 - 12:15	*Felipe Contreras* *UACM* *New tools for the non-linear analysis of time series*	*Carlos Islas* *UACM* *Cell structures and mappings*
12:15 - 13:10	*Francisco Torres* *FC-UNAM* *Products of Hilbert Spaces & Types of Independence*	Luis Alberto Quezada UAM-C *Building Analytical Relations From Experimental Data*
13:10 - 15:30	*Receso*	*Receso*
15:30 – 16:45	Sesiones simultáneas de trabajo: *EDPs, álgebras C*, análisis y cómputo*	Sesiones simultáneas de trabajo: *EDPs, álgebras C*, análisis y cómputo*
16:45 - 17	*café*	*café*
17 - 18:25	Sesiones simultáneas de trabajo: *EDPs, álgebras C*, análisis y cómputo*	Sesiones simultáneas de trabajo: *EDPs, álgebras C*, análisis y cómputo*
18:30		*Clausura*

Abstracts

New tools for the non-linear analysis of time series
Felipe Contreras (UACM)

Time series from a variety of sources, like those from biological processes or diverse complex phenomena, have been analyzed using different techniques and with diverse degrees of reliance in the results. Time series are data collected at fixed time intervals for a certain time. They can come from economic information, markets, biological o physiological signals, social behavior like traffic on the streets or social networks, as well as other physical processes. In this talk we introduce the topic and new tools for its use in this analysis technique.

From defining Lebesgue Spaces to control of dispersive KdV-like equations
Cynthia Flores (CSUCHI)

The purpose of the first talk is to introduce Lebesgue spaces using the Fourier Transformation. In order to appeal to the broadest possible audience including undergraduate students, we will use the heat equation as a model problem. We will define and discuss dispersive systems, as well as some physical applications. Additionally, we investigate the exact control problem associated to the linearized dispersion-generalized Benjamin-Ono equation, which contains fractional order spatial derivatives, on $\mathbb{T}$ the one-dimensional torus

$$\partial_t u(x,t)+D^{1+a}\partial_x u(x,t)=f(x,t)$$

for $0<a<1, x\in[0,2\pi]$ y $t\geq 0$, where D^{1+a} denotes the homogeneous derivative. We impose that

$$\frac{\partial^k u}{\partial x^k}(0,t)=\frac{\partial^k u}{\partial x^k}(2\pi,t)$$

for $k=0,1$ and 2 so that the process is 2π -periodic in x , and additionally, it is assumed that the distributed control *f* is generated by a linear feedback law conserving the volume $\int u(x,t)dx$. The stabilizability problem with a linear feedback control is also studied.

The second talk will begin with an overview of the semi-group theory associated to linear dispersive systems and a discussion of the controllability of the associated nonlinear dispersion-generalized Benjamin-Ono problem based on the Fredholm Alternative. The dispersion operator in the linear DGBO presents a continuum of operators between the well-known Korteweg-de Vries equation and the Benjamin-Ono equation. We introduce local exact control and local exponential stability of periodic solutions of fifth order Korteweg-de Vries type equations in $H^s(T), s>2.$ A dissipative term is incorporated into the control which, along with a propagation of regularity property, yields a smoothing effect permitting the application of the contraction principle. Finally, We examine L^2 well-posedness and

stabilization property of the full dispersion-generalized Benjamin-Ono equation with periodic boundary conditions. The main ingredient of this new result is a development of dissipation-normalized Bourgain space, which gains smoothing properties simultaneously from dissipation and dispersion within the equation.

Cell structructures and mappings
Carlos Islas

The cell structure as inverse sequences of graphs defined by Debski and Tymchatyn in 2016 provide cell mappings between the corresponding spaces. In this talk we present this structure and cell mappingsin some discrete spaces that give an approximation with other spaces.

Building Analytical Relations From Experimental Data
Luis Alberto Quezada (UAM-C)

For several centuries, scientists have proposed various models that underlie physical phenomena. Despite the computational tools, the challenge is finding correlations between the observed data and its analytical representations. In this talk, various approach are addressed to generate this relationship, from the identification of parameters in transfer functions to algorithms that allow discovering Hamiltonians, Lagrangians and other laws of geometric and momentum conservation.

Products of Hilbert Spaces & Types of Independence
Francisco Torres (UNAM)

In the frame of Non Commutative Probability Theory, the talk explains he relation between the free, boolean, monotone and orthogonal independencies and different types of products of Hilbert spaces. Such products are used as base space to find representations of these types of independencies via bounded operators.

Joint work with Octavio Arizmendi, CIMAT