Third International Topological Algebras Day: Program

Time	Lecturer	Affiliation	Title
9:00-9:15	Openning Ceremony		
9:30-10:30	Hugo Arizmendi	IMATE-UNAM	Pseudo-Q locally convex algebras. Joint work with Angel Carrillo-Hoyo
10:30-11:00	Alejandra García	UAM-I, México	Hereditary properties of a locally pseudoconvex algebras A on the algebra of functions $C_b(X, A)$ Joint work with Lourdes Palacios and Carlos Signoret.
11:00-11:30	Pavel Ramos Martínez	Facultad de Ciencias, UNAM	B ₀ -algebras with cyclic basis of Laurent type.
11:30-12:00	Antoni Wawrzynczyk	UAM-I, México	¿Solución del problema de Fell y Doran para espacios de Banach?
12:00-12:10	Coffee Break		
12:10-12:40	Mart Abel	University of Tartu/University of Tallinn, Estonia	On universal problem for sheaves.
12:40-13:10	Yuliana Zárate	UAM-I, México	On Q _{qt} -algebras Joint work with Lourdes Palacios
13:10-14:10	Mati Abel	University of Tartu, Estonia	On Mackey Q-algebras.
14:10-15:45	Lunch		
15:45 -16:15	Slaviša Djordjević	BUAP, Puebla, México	Invariant subspaces, v-convergence and spectral continuity
16:15-16:45	Gabriel Kantún	BUAP, Puebla, México	Linear preservers of generalized inverses.
16:45 -17:15	Reyna María Pérez Tiscareño	UAM-I, México	Wedderburn structure theorems for two-sided locally m-convex H*-algebras. <i>Joint work with Marina Haralampidou</i>
17:15-17:25	Coffee Break		
17:25-17:55	Lourdes Palacios	UAM-I, México	On barrelledness in locally convex algebras. Joint work with Marina Haralampidou, Mohamed Oudadess and Carlos Signoret
17:5518:25	Carlos Signoret	UAM-I, México	On bornological notions in locally convex algebras. Joint work with Marina Haralampidou, Mohamed Oudadess and Lourdes Palacios

Abstracts of the talks:

a. Pseudo-Q locally convex algebras.

Hugo Arizmendi, IMATE-UNAM. Joint work with Angel Carrillo, IMATE-UNAM.

G.R. Allan has introduced the concept of spectrum for elements in a locally convex algebra. His idea derives from the spectral theory of a closed operator *T* on a Banach space E. In this theory the spectrum is the set of all the complex numbers λ for which λI -*T* has no bounded inverse. Allan establishes a suitable definition of bounded element in a locally convex algebra that, according to his own words, "is justified by the theory which stems from it". Similar ideas are discussed by L. Waelbroeck for unital commutative quasi-complete locally convex algebras. We introduce the new concept of pseudo-Q algebra. This is a generalization of the notion of pseudo-complete algebra given by G.R. Allan. Using it we study and compare the spectrum $\sigma_A(x)$ given by him, and the extended spectrum $\Sigma(x)$, given by W. Żelazko, for *x* in a unital locally convex algebra.

b. Hereditary properties of a locally pseudoconvex algebra A on the functions algebra C_b(X, A).
Alejandra García García. UAM-I, México. Joint work with Lourdes Palacios, UAM-I, and Carlos Signoret, UAM-I.

Let X a completely regular Hausdorff space. We denote by C(X, A) the locally pseudoconvex algebra of all continuous functions on X with values in a locally pseudoconvex Hausdorff commutative algebra A with unit, and by $C_b(X, A)$ the subalgebra of C(X, A) of all bounded continuous functions Avalued on X. In $C_b(X, A)$ we consider the topology of the uniform convergence with respect to the family of seminorms on A. We show that if A is k-normed, k-Banach, spectral, m-pseudoconvex or mpseudoconvex complete algebra, then $C_b(X, A)$ is the same type.

*c. B*₀–algebras with cyclic basis of Laurent type.

Pavel Ramos Martínez. Facultad de Ciencias, UNAM. México.

In this talk we consider unitary commutative B_0 -algebras with a basis of the form $\{z^{-n}, z^n\}_{n=1}^{\infty}$ and study some properties of the spectrum of the generator $\sigma(z)$; using spectral radius we characterize all basis of this type. Also we consider an *m*-convex commutative B_0 -algebra with identity *A*, and give necessary and sufficient conditions on the spectrum $\sigma(z)$ in order to *A* be isomorphic to an algebra of holomorphic functions defined on a domain Ω with the compact-open topology; also we will see that this condition is equivalent to another one depending on the behavior of the semi- norms $\{|| \cdot ||_i\}_{i=1}^{\infty}$, defining the topology of *A* on the basis $\{z^{-n}, z^n\}_{n=1}^{\infty}$.

d. ¿Solución del problema de Fell y Doran para espacios de Banach? Antoni Wawrzynczyk, UAM-I, México Supuestamente he probado que el problema de Fell y Doran tiene

Supuestamente he probado que el problema de Fell y Doran tiene solución positiva en los espacios de Banach: Cada representación irreducible de un álgebra asociativa real o compleja *A* en un espacio de Banach *X* es totalmente irreducible. La demostración es sospechosamente sencilla. Podemos discutir sobre el tema.

- e. On universal properties for sheaves. Mart Abel, University of Tartu/University of Tallinn, Estonia. This talk is based on joint papers by Mart Abel and Patrice P. N tumba. We present the universal property and some other properties of certain sheaves in two different approaches: in algebraic way and in functorial/categorical approach.
- f. On Q_{qt}-algebras. Yuliana Zárate , UAM-I, México. Joint work with Lourdes Palacios.

Irving Kaplansky introduced in 1948 the "Q-Property" in the frame of topological rings. A unital topological algebra A is a Q-algebra if the set of its invertible elements is an open set. If the algebra is non-unital, this property can be stated considering quasi-invertible elements instead of invertible ones (with o operation). A.D. Thatte and Subhash J. Bhatt, in 1984, introduced the notion of topological invertible elements; so it makes sense to consider the corresponding Q_t and Q_{qt} -properties as well. Later on, in 2006, Abdelak Najmi studied Q_t -algebras in the non-unital commutative case. Finally, in 2011, W. Zelazko and M. Abel described several properties of a left (right) unital Q_t -algebra.

In this talk we show several properties of topological algebras satisfying Q_{qt} -property in the non unital, non commutative case, and characterize left Q_{qt} -algebras as well.

- g. Mackey Q-algebras
 - Mati Abel, University of Tartu, Estonia

A topological algebra A is called a *Mackey Q-algebra* when the set Q-inv(A) (Inv(A) in the unital case) of all quasi-invertible (respectively, invertible) elements in A is open in the Mackey closure topology. What means the Mackey closure topology? When every Mackey Q-algebra is a Q-algebra? Which properties have Mackey Q-algebras? The answers to these questions I shall introduce in my talk.

h. Invariant subspace, v-convergence and spectral continuity Slaviša Djordjević, Benemérita Universidad Autónoma de Puebla

Let T, T_n, $n \in N$, be bounded linear operators defined on a Banach space X. in this paper we study the convergence $\gamma(T_n) \rightarrow \gamma(T)$, $\gamma \in \{\sigma, \sigma_{ap}\}$, when $\{T_n\}$ converges to T, in a new mode of convergence, observed by Mario Ahues et al.: the v-convergence. Moreover, if E is a closed subspace of X that is invariant for all T_n and T, then we will determinate the convergence of $\sigma(T_n)$ to $\sigma(T)$ in terms of spectral convergence of restriction operators of T_n and T to E and the operators in the quotient space X/E introduced by natural homomorphism.

i. Linear preservers of generalized inverses.

Gabriel Kantún, BUAP, Puebla, México. gkantun@fcfm.buap.mx

The linear preserver problem consists in finding a characterization for linear maps between operator algebras that leave invariant certain properties, quantities or subsets. This problem can usually be formulated in more general settings. For instance, Kaplansky's problem is stated in the following terms: "Let φ be a unital surjective linear map between two semi-simple Banach algebras *A* and *B* which preserves invertibility, that is, $\varphi(x)$ is invertible in *B* whenever *x* is invertible in *A*. Is it true that φ is a Jordan homomorphism?". In this talk we will give an overview of Kaplansky's problem and related results for generalized inverses.

- j. Wedderburn structure theorems for two-sided locally m-convex H*-algebras. Reyna María Pérez Tiscareño, UAM-I, México. Joint work with Marina Haralampidou.
 We give the first and the second structure theorems for certain two-sided locally m-convex H*-algebras, which constitute a generalization of two-sided H*-algebras considered by P. Saworotnow.
- k. On barrelldness in locally convex algebras.

Lourdes Palacios, UAM-I, México. Joint work with Marina Haralampidou, Mohamed Oudadess and Carlos Signoret.

Besides the very classical barrelledness in locally convex algebras, as locally convex spaces, several notions of a specific kind of barrelledness pertaining to the algebra structure, have been introduced, according to the context someone is working in. The aim of this talk is to give an idea of all of them. Characterizations and comparisons of all of them will be given. The characterizations are given in terms of (algebra) seminorms, which are the respective ones of vector space seminorms in locally convex spaces.

I. On bornological notions in locally convex algebras

Carlos Signoret, UAM-I, México. Joint work with Marina Haralampidou, Mohamed Oudadess and Lourdes Palacios.

Modern bornology is the search and systematic study of all aspects where bounded sets play an important or even leading role. This talk is a result of an ongoing research and is a synthetic presentation of several bornologicity notions in locally convex algebras; this approach reveals a new notion of bornologicity. Examples, comparisons and characterizations via algebra seminorms will be given.