Resúmenes

- **J. Spielberg, Arizona State University**

  Title: "Graphs, groupoids, and C*-algebras

  Abstract.
  C*-algebras were first studied as functional-analytic objects giving a linear representation theory to non-linear objects such as groups. During the last 50 years these algebras have been found to play important roles in many areas of mathematics. One of the most profound examples was Cuntz's discovery of the purely infinite simple C*-algebras that bear his name. It was soon apparent that the combinatorial properties of a finite directed graph were at the heart of the matter. This idea has lead to a very rich theory that will be the subject of my talks. I will begin with a brief description of C*-algebras, mainly with the help of a few examples (notably, the Cuntz algebras). The remarkable properties of these algebras are most easily understood by means of an associated groupoid. A groupoid may be thought of as arising from local symmetries of an object, in much the same way that a dynamical system arises from a group of symmetries. In the second talk I will introduce groupoids, again with the help of the Cuntz algebras. I will indicate the relationship between combinatorial properties of directed graphs, dynamical properties of groupoids, and structural properties of C*-algebras. In the third talk I will describe some recent generalizations of directed graphs.

- **S. Djordjevic,**

  Title: "Invariant subspace and spectral properties of linear operator"

  Abstract. Let H and K be Banach spaces, let $B(H, K)$ denote the set of bounded linear operators from H to K, and abbreviate $B(H, H)$ to $B(H)$. Let for the Banach space X, $T \in B(X)$ has an invariant

closed subspace H that is complemented with the closed subspace K. Let $A \in B(H)$ be the restriction of T to H and $B \in B(K)$ and $C \in B(K, H)$ such that

$$T = \begin{pmatrix} A & C \\ 0 & B \end{pmatrix} : H \oplus K \to H \oplus K. \tag{1}$$

In this talk we will describe spectrum, Weyl's and Browder's spectrum of the operator T using spectral property of operators A and B.

Moreover, if the T-invariant subspace H is not complemented in X we will describe the spectrum and different part of the spectrum of T using the restriction of T to H and the mapping $T_{|X/H}$ determined by T on the quotient space X/H of this invariant subspace.

- **A. Movchan, University of Liverpool.**

TITLE: "ASYMPTOTIC APPROXIMATIONS FOR MEDIA WITH DEFECTS IN CONTINUUM MECHANICS"

Abstract.

The course gives an introduction to asymptotic methods of approximation for solutions to perturbation problems in mathematical models of continuum mechanics. The special attention will be given to models of solids containing cracks and small inclusions, including those problems where the boundary of a domain is singularly perturbed. An important part of the course will deal with dispersive waves in structured media. In particular, effects of filtering and polarization of elastic waves in heterogeneous media will be highlighted.

- **R. Harte,**

TITLE: "THE SPECTRAL TOPOLOGY IN RINGS"

Abstract. The spectral topology of a ring is easily defined, has familiar applications in elementary Banach algebra theory, and appears relevant

to abstract Fredholm and stable range theory. In particular it tells us that commutative Banach algebras have "Bass stable rank 1".

- **J. Rivera**

  Title: "Uniform rectifiability in the parabolic sense"

  Abstract.

  We describe some progress in connection with the so called parabolic uniform rectifiability. The notion of uniform rectifiability was introduced in the standard (non-parabolic) case to generalize some results of harmonic analysis, such as boundedness of singular integrals and estimates for harmonic measure, from Lipschitz graphs to more general sets with appropriate Hausdorff dimension. We plan to review first some motivations and basic ideas from the work of G. David and S. Semmes. The parabolic case aims the same sort of generalization, taking into account the appropriate version of Lipschitz functions adapted to problems associated to the heat equation. In this case our plan is to review some results of S. Hofmann, J. Lewis and collaborators, as well as some other recent developments and conjectures.

- **G. Miszuris, University of Aberystwyth.**

  Title: "Waves and fracture in inhomogeneous lattice structures

  Abstract. We analyse a crack propagating in inhomogeneous rectangular lattice. The filtering properties of a lattice are linked to the energy dissipation due to waves initiated by the crack. The influence of the inhomogeneities within the lattice on the lattice trapping is investigated. The properties of waves generated by cracks are linked to spectral properties of Bloch-Floquet waves in undamaged inhomogeneous lattice. We show that in some structures where the harmonic waves localized at the crack faces can force the crack to grow with a constant speed. In the steady-state regime, the crack speed coincides with the wave phase speed, while the group velocity of the wave must exceed its phase speed. In related numerical simulations, in addition to the steady-state regime, an ordered crack-speed oscillation regimes are

revealed, where the averaged crack speed depends on the wave amplitude. We show that the related cluster-type wave representation allows the determination of this averaged crack speeds.

- **C. Villegas,**

  Title: "Spaces of Holomorphic Fucntions in Mathematical Physics"

  Abstract.

  In this set of lectures, we will introduce the spaces of holomorphic functions, emphasizing mainly in properties of Bergman and Bargmann spaces. We also will deal with coherent states in this context and some of their semi classical properties.

- **R. Martinez-Avendaño, UAEH.**

  Title: "Subspace-hypercyclicity

  Abstract. An operator T is said to be hypercyclic if there exists a vector x such that the orbit of x under T is dense in the subspace; such a vector x is called a hypercyclic vector. One of the reasons hypercyclicity is interesting is because it relates to the invariant subset problem; namely, an operator has no invariant closed subsets if and only if all of its vectors are hypercyclic. In this talk, we will introduce the concept of subspace-hypercyclicity, which generalizes the concept of hypercyclicity. We will show some nontrivial examples of subspace-hypercyclic operators and we will answer a few basic questions about these operators.

- **H. Compeán,**

  Title:

  Abstract.