New Hampshire Operator Theory Symposium 2009

Schedule of Events

10:00 - 11:00

Speaker: Erik van Erp

Title: Contact structures of higher codimension: an analytic perspective

Abstract: A contact manifold is a manifold equipped with a codimension one distribution that satisfies a certain "maximal non-integrability" condition. Contact manifolds appear naturally as boundaries of complex domains. Operators of interest on contact manifolds are the tangential Cauchy-Riemann operator and the Szego projector. The Heisenberg calculus is the appropriate pseudodifferential calculus for the analysis of these operators.

We propose a simple condition on a distribution of higher codimension that generalizes this geometric structure. Geometrically, our condition is satisfied, for example, for the Carnot Caratheodory structure on the boundary of hyperbolic space, or for a natural codimension 3 distribution on the boundary of domains in hyperkahler manifolds. We characterize these higher codimension "contact structures" in terms of a property of the appropriate Heisenberg calculus. We construct a natural generalization of the tangential CR operator, and prove that it has similar spectral properties as its classical counterpart. There is a Szego projector, and the Boutet de Monvel index theorem holds for the associated Toeplitz operators.

11:00 - 12:00

Speaker: Liming Ge

Title: Kadison-Singer algebras

Abstract: The algebra of operators which leave one, two or three subspaces invariant will be described. Kadison-Singer algebras (and Kadison-Singer lattices) will be introduced as generalizations of those algebras. Certain noncommutative geometrical aspect of these algebras will be discussed. (This is joint work with Wei Yuan)

12:00 - 1:30

Lunch in Kemeny 300

1:30 - 2:30

Speaker: Fred Schultz

Title: Geometry of the space of separable states

Abstract: A state on $M_n \otimes M_m$ is separable if it is a convex combination of product states. Such states are of importance in quantum information theory. The structure (as a compact convex set) for the set of all states has been thoroughly studied, but much less is known for the convex set of separable states. Though the representation of a separable state as a convex combination of pure product states is not unique, we show that for low rank states such a representation is generically unique, and discuss some consequences for the facial structure of the space of separable states.

2:30 - 3:30

Speaker: Junhao Shen

Title: On Blackadar and Kirchberg's MF Algebras

Abstract: In the talk, we will introduce the concept of Blackadar and Kirchberg's MF algebra. Then we will show how to use this concept of MF algebra to study the problem whether the BDF-extension semigroup of a unital C*-algebra is a group. Next we will present some examples of MF algebras whose BDF extension semigroups are not groups. (This is a joint work with Don Hadwin, Jiankui Li and Liguang Wang.)

3:30 - 4:00

BREAK

4:00 - 5:00

Speaker: Qihui Li

Title: Topological Free Entropy Dimension in Unital C*-Algebras

Abstract: D. Voiculescu has introduced and studied a C*-algebra version of his free entropy dimension. We describe the basic definitions and some new notions and new results on this subject. In particular we show that the topological free entropy dimension of a finite generating set of a nuclear C*-algebra is at most 1 (when it is defined). We also include results on free products. (This is a joint work with Don Hadwin and Junhao Shen.)

DINNER

Dinner will be at Jesse's in Hanover. The reservation is for 6:15. From Dartmouth, take N. Park St South, back towards I-89. Continue straight through the funny intersection, with the Hanover Co-Op on the left, and onto Rt 120. The restaurant is on the left at the second set of lights and there is a gas station to the right.