Mini course:
Model theory of Hilbert spaces

Camilo Enrique Argoty Pulido
Universidad Sergio Arboleda
Bogotá, Colombia

Abstract

This mini course is deals with the model theory, in the frame of continuous logic, of Hilbert spaces expanded with different colections of operators. It is based on the work of José Iovino, Charles Ward Henson, Itaï Ben Yaacov, Alexander Berenstein and Camilo Argoty.

1 Introduction

The course is planned for three sessions. First, the basics of model theory of Hilbert Spaces. In the second one, we present the model theory of a Hilbert space expanded with a single normal operator. In the third session, we deal with the model theory of a Hilbert space as a module for a $C^*$-algebra.

2 Course program

First session: Basic model theory of a Hilbert space.

2. First order continuous logic.
3. The first order continuous logic structure of a Hilbert space.
5. The monster model.
6. Algebraic and definable closures.
7. Types.
8. Stability, independence and non-forking.
Second session: Model theory of a Hilbert space expanded with a bounded normal operator.

2. The first order continuous logic structure of a Hilbert space expanded with a bounded normal operator.
3. The theory of Hilbert spaces expanded with a bounded normal operator.
4. The monster model.
5. Algebraic and definable closures.
6. Types.
7. Stability, independence and non-forking.
8. A particular case: The generic automorphism on a Hilbert space.

Third session: Model theory of a representation of a non-unital abelian $C^*$-algebra.

1. $C^*$-algebras.
2. The first order continuous logic structure of a representation of a non-unital abelian $C^*$-algebra.
3. The theory of a representation of a non-unital abelian $C^*$-algebra.
4. The monster model.
5. Algebraic and definable closures.
6. Types.
7. Stability, independence and non-forking.

References


