Master programme on
"Mathematics and Applications"
Department of Mathematics (UAM)
Academic Year 2010-2011

Advanced Course in Algebra
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Scope and objectives

We present a course in Model Theory with applications to groups and fields. The course begins with a brief introduction to model theory. Basic techniques are introduced for the study of o-minimal structures. An o-minimal estructure is a generalization of the ordered field of the real numbers. Then definable sets in these structures are studied, in particular semialgebraic sets. Finally, with the tools already at hand, definable groups are introduced. A typical example of definable groups is a compact Lie group.

Contents

1. Introduction to model theory. The compactness theorem.

2. Semialgebraic sets and definable sets. Examples of o-minimal structures.

3. Cell decomposition. Definably connected components. Curve selection lemma.

4. Definable inavariants: Dimension and o-minimal Euler characteristic.

5. Triangulation of definable sets.

6. Introduction to the theory of definable groups.

Bibliography

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4. Prestel, A., Model Theory for the Real Algebraic Geometer. Dott. di Ric. in Mat. Pisa (1998)
5. Marker, D., Model Theory: An Introduction, GTM, Springer 2002