

Course Announcement
An Introduction to O-Minimality
Math 285D, Winter Quarter 2008
MWF 3–3:50pm, Mathematical Sciences Building 5217

Instructor. Matthias Aschenbrenner

E-mail. matthias@math.ucla.edu

Office. Mathematical Sciences Building 5614

Office phone. (310) 206-8576

Office hours. To be announced.

Description. O-minimality is a property of ordered structures which yields results generalizing the classical finiteness theorems long known to hold for semialgebraic and subanalytic sets, such as the existence of cell decompositions and Whitney stratifications. This leads to a development of a kind of “tame topology” (envisaged by Grothendieck). Although originating in model theory, over the last twenty years, the notion of an o-minimal structure has proven to be increasingly useful in the fields of real algebraic and real analytic geometry. The general theory has even had applications to subjects as varied as Lie theory, economics, and neural networks.

This course will be split into two parts. In the first half, we will introduce the o-minimality axiom and develop its main consequences. We will discuss basic facts about o-minimal structures: their geometric, model-theoretic, and algebraic (valuation-theoretic) properties. The second half of the course will be designed according to the interests of the participants. Possibilities include the discussion of some of the various new and mathematically interesting examples of o-minimal structures, and methods to construct them, which have emerged in recent years; or a further development of the valuation theory of o-minimal structures, with applications to limit sets and tropical geometry.

Prerequisites. Some basic knowledge of first-order logic, model theory, and abstract algebra should be sufficient. No knowledge of real algebraic and analytic geometry will be assumed.

Course text. The following book will be a good companion for the first half of the course:

Lou van den Dries, *Tame Topology and O-Minimal Structures*, London Math. Soc. Lecture Note Series, vol. 248, Cambridge University Press, Cambridge (1998).