O-minimality and sheaf cohomology

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Resumo: Model theory is a field which investigates possible applications of methods of mathematical logic in other areas of mathematics. The recent impact of model theoretic techniques in algebra, algebraic geometry, number theory, has been remarkable. O-minimality is the analytic part of model theory and deals with theories of ordered, hence topological, structures satisfying certain tameness properties. It generalizes semi-algebraic and subanalytic geometry and it is claimed to be the formalization of Grothendieck's notion of tame topology (topologie modérée). Model theory has strong connections to other branches of mathematics as algebra, analysis and geometry and its results often have implications in these areas. The geometry of definable sets have had an impact in the theory of definable groups. For example: the triangulation theorem allows the development of an o-minimal singular (co)homology with Hurewicz theorem, Künneth formula, Poincaré duality and degree theory which are essential ingredients in the proof of Pillay's (resp., compact domination) conjecture in the field case (a non-standard analogue of Hilbert's 5^{th} problem for locally compact topological groups). The aim of our work is to contribute to the development of the theory of o-minimal sheaf cohomology by defining the six Grothendieck operations in this setting. Beside their own interest, these constructions will provide the main missing ingredients to obtain general and unified proofs of some problems (e.g. Pillay's and compact domination conjectures) of o-minimal geometry about definably compact definable groups in arbitrary o-minimal structures.

palavras-chave: O-minimal structures; homological algebra; sheaf theory.