

This thesis analyses the semialgebraic sets, that is, a finite union of solutions to a finite sequence of polynomial inequalities. We introduce a notion of cylindrical algebraic decomposition as a tool for the construction of a semialgebraic stratification and a triangulation of a semialgebraic set. On this basis, we prove several important and well-known results of real algebraic geometry, such as Hardt's semialgebraic triviality or Sard's theorem. Drawing on Morse theory, we finally give a proof of a Thom-Milnor bound for a sum of Betti numbers of a real algebraic set.