1046-00-110 **Jouko Väänänen***, University of Amsterdam, ILLC, Plantage Muidergracht 24, 1018 TV Amsterdam, Netherlands. *Set theoretic methods in model theory.*

I raise the question, how can we make sense of the statement that we have found an extremely complicated structure? The orbit of a countable structure is always on some level of the Borel hierarchy. The transfinite levels of the Borel hierarchy, calibrated by countable ordinals, put countable structures on levels. The higher the level, the more complicated the structure. What about uncountable structures? Models of cardinality $\aleph_1$ can be thought of as points in the space $\mathcal{N}_1$ of functions $f : \omega_1 \to \omega_1$, endowed with the G_δ topology. The class of *Borel* sets of the space $\mathcal{N}_1$ is the smallest class of sets containing the open sets and closed under complements and unions of length ω_1. A set is *analytic* if it is a continuous image of a closed subset of $\mathcal{N}_1$. Orbits of structures of cardinality $\aleph_1$ are, a priori, *analytic*, but are they Borel? We give an overview of set-theoretic and model-theoretic methods for getting at least partial solutions to this problem. (Received September 10, 2008)