1088-03-132 **Nathanael Ackerman*** (nate@math.harvard.edu), Harvard University, Department of Mathematics, Cambridge, MA 02138. *Computability of 0-1 Laws.*

One of the most remarkable results in finite model theory is that for any first order sentence φ,

$$\lim_{n\to\infty} \frac{|\{M \models \varphi : |M| = n\}|}{|\{M : |M| = n\}|}$$

is either 0 or 1. In other words, any sentence is realized asymptotically almost surely (a.a.s.) or asymptotically almost never among all finite structures (of a fixed language). This is called the 0-1 law for first order logic. Since its discovery, several other 0-1 laws have been identified for other collections of finite structures, such as finite graphs, finite triangle-free graphs, and finite partial orders.

Given any complete first order theory T, we can look at the collection of finite subsets of infinite models of T, $\mathcal{C}(\mathrm{T})$, and ask which sentences hold a.a.s. This gives us a map $L^{0,1}(\cdot)$ which takes a complete theory and returns the collection of sentences which hold a.a.s. of structures in $\mathcal{C}(\mathrm{T})$. We can then ask "How computable can the output $L^{0,1}(\mathrm{T})$ be, when the input T is a computable complete theory and $\mathcal{C}(\mathrm{T})$ satisfies a 0-1 law?"

In this talk we will formalize these concepts and provide a complete answer to this question. (Received February 07, 2013)