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Eduardo Dueñez* (eduardo.duenez@utsa.edu), Mathematics Department, The University of Texas at San Antonio, San Antonio, TX 78249, and **José N Iovino**. *Polynomial ergodic descent and uniformly metastable convergence*.

We formulate the Mean Ergodic Theorem (MET) for polynomial actions of an abelian group on a Hilbert space as a statement about classes of metric structures that are axiomatizable in a suitable first-order-like logic (Henson’s logic of “approximate satisfaction” of positive bounded formulas). This formulation allows for a very clean proof of MET. As a byproduct of the first-order axiomatization, we show that ergodic averages admit uniformly metastable rates of convergence (in Tao’s sense) using the compactness principle in logic.

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