1125-03-1048   **Eduardo Dueñez*** (`eduardo.duenez@utsa.edu`), Mathematics Department, The University of Texas at San Antonio, 1 UTSA Circle, San Antonio, TX 78249-0664, and **José N Iovino**.
Uniformly metastable convergence in metric structures.

We study Tao's finitary viewpoint of convergence in metric spaces, as captured by the notion of metastability with a uniform rate. We adopt the perspective of continuous model theory. We show that, in essence, uniform metastability is the only formulation of metric convergence that can be captured by a theory in continuous first-order logic, a result we call the Uniform Metastability Principle. Philosophically, this principle amounts to the following meta-theorem: *"If a classical statement about convergence in metric structures is refined to a statement about uniformly metastable convergence, then the validity of the original statement implies the validity of its uniformly metastable version."* As an instance of this phenomenon, we formulate an abstract version of Tao's Metastable Dominated Convergence Theorem as a statement about axiomatizable classes of metric structures, and show that it is a direct consequence of the Uniform Metastability Principle.