1107-37-275 **Svetlana Katok*** (`katok_s@math.psu.edu`), Department of Mathematics, The Pennsylvania State University, University Park, PA 16802. *The Fried average entropy for smooth group actions and connections with algebraic number theory.*

In a joint work with A. Katok and F. Rodriguez Hertz we study numerical entropy-type invariants suitable for smooth actions of higher rank abelian groups on n-dimensional compact smooth manifolds by smooth transformations preserving a Borel probability measure (the standard notion of entropy assigns value zero to the entropy of such actions). One such invariant, based on averaging approach, was introduced by D. Fried in 1983 and for many years was essentially forgotten. We rediscovered it, but later found Fried's paper and now call this invariant the Fried average entropy. Arithmeticity of maximal rank smooth abelian actions proved by A. Katok and F. Rodriguez Hertz implies that the Fried entropy for maximal rank positive entropy actions is closely related to regulators of totally real number fields. This leads to striking conclusions: (i) for maximal rank actions the Fried entropy can only take countably many values, (ii) in the weakly mixing case the Fried entropy is either equal to zero or is bounded away from zero by a positive function that depends only on the dimension n and grows exponentially with it; we use algebraic number theory to obtain the latter result. (Received January 17, 2015)