

# Model-theoretic stability and superstability in classes of modules

Marcos Mazari-Armida

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Dividing lines in complete first-order theories were introduced by Shelah in the early seventies. A dividing line is a property such that the classes satisfying such a property have some nice behaviour while those not satisfying it have a bad one. Two of the best understood dividing lines are those of *stability* and *superstability*.

In this talk, I will study the notion of stability and superstability in abstract elementary classes of modules with respect to pure embeddings, i.e., classes of the form  $(K, \leq_p)$  where  $K$  is a class of  $R$ -modules for a fixed ring  $R$  and  $\leq_p$  is the pure submodule relation. In particular, using that the class of  $p$ -groups with pure embeddings is a stable AEC, I will present a solution to Problem 5.1 in page 181 of *Abelian Groups* by László Fuchs. Moreover, I will show how the notion of superstability can be used to give new characterizations of noetherian rings, pure-semisimple rings, and perfect rings.