1077-51-1 **Assaf Naor*** (naor@cims.nyu.edu), 251 Mercer St, New York, NY 10012-1185. *The Ribe Program.* Preliminary report.

A theorem of M. Ribe from 1976 asserts that finite dimensional linear properties of normed spaces are preserved under uniformly continuous homeomorphisms. Thus, normed spaces exhibit a strong rigidity property: their structure as metric spaces determines the linear properties of their finite dimensional subspaces. This clearly says a lot about the geometry of normed spaces, but one can also use it to understand the structure of metric spaces that have nothing to do with linear spaces, such as graphs, manifolds or groups. After all, there is a deep and rich theory of finite dimensional linear invariants of Banach spaces with far reaching structural consequences. In view of Ribe's theorem we know that these invariants are preserved under homeomorphisms that are "quantitatively continuous", so in principle one can reformulate them using only the notion of distance; without referring to the linear structure in any way. Once this is achieved, one can study these properties in the context of general metric spaces using insights that originally made sense only in the context of linear spaces, and use these insights to solve problems in areas that do not have a priori connections to normed spaces. Thus, Ribe's rigidity theorem inspired a research program, known today as the Ribe program, which was formulated by Bourgain in 1986, the goal being to find explicit metric reformulations of key concepts and theorems from the theory of normed spaces. Major efforts by many mathematicians over the past 25 years led to a range of remarkable achievements within the Ribe program, with applications to areas such as group theory, harmonic analysis, and computer science. This talk will be a self-contained and elementary introduction to the Ribe program. We will explain some of the milestones of this research program, describe some recent progress, and discuss some challenging problems that remain open. (Received September 22, 2011)