

Ulam stability for quantum groups

In recent years, there has been a growing interest in the study of approximate representations of various algebraic structures. This is due to some very deep connections with (1) approximation properties for groups and (2) questions about robustness in quantum information theory. The basic question that we are interested in is the following: If we are given a linear map from an algebra (or group) into the bounded operators on a Hilbert space that is “almost” multiplicative, under what conditions can we guarantee that this map is a small perturbation of an actual representation of the algebra? I will describe some of the history around this problem as well as some ongoing work with Junichiro Matsuda (Kyoto) and Jennifer Zhu (Waterloo), where we investigate the Ulam (=operator norm) stability of approximate representations for compact and discrete quantum groups.