A homological property and Arens regularity of locally compact quantum groups

Mohammad Reza Ghanei, Rasoul Nasr-Isfahani, Mehdi Nemati, and Mehdi Nemati

Abstract. We characterize two important notions of amenability and compactness of a locally compact quantum group $\mathbb{G}$ in terms of certain homological properties. For this, we show that $\mathbb{G}$ is character amenable if and only if it is both amenable and co-amenable. We finally apply our results to Arens regularity problems of the quantum group algebra $L^1(\mathbb{G})$; in particular, we improve an interesting result by Hu, Neufang and Ruan.