Mackey-Type Identity for Invariant Functions on Lie Algebras of Finite Unitary Groups and an Application

The Mackey-type identity mentioned in the title relates the operations of parabolic induction and restriction for invariant functions on the Lie algebras of the finite unitary groups $U(N, \mathbb{F}_q^2)$. This result is applied to constructing positive harmonic functions on a new branching graph with a negative Hall-Littlewood parameter, as introduced in the authors’ previous paper [Advances Math. 395 (2022), 108087]. This in turn implies the existence of an infinite-parameter family of invariant measures for the coadjoint action of an infinite-dimensional analogue of the groups $U(N, \mathbb{F}_q^2)$.

Keywords: Finite unitary groups, branching graphs, Mackey’s theorem.

MSC: 20C33, 22E65, 16T10.