CLASSICAL METHOD OF CONSTRUCTING A COMPLETE SET OF IRREDUCIBLE REPRESENTATIONS OF SEMIDIRECT PRODUCT OF A COMPACT GROUP WITH A FINITE GROUP

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Abstract: Let $G = U \rtimes S$ be a group of semidirect product of $U$ compact and $S$ finite. For an irreducible representation (= IR) $\rho$ of $U$, let $S([\rho])$ be the stationary subgroup in $S$ of the equivalence class $[\rho] \in \hat{U}$. Intertwining operators $J_\rho(s)$ $(s \in S([\rho]))$ between $\rho$ and $s^{-1}\rho$ gives in general a spin (= projective) representation of $S([\rho])$, which is lifted up to a linear representation $J_\rho'$ of a covering group $\tilde{S}([\rho])$ of $S([\rho])$. Put $\pi^0 := \rho \cdot J_\rho'$, and take a spin representation $\pi^1$ of $\tilde{S}([\rho])$ corresponding to the factor set inverse to that of $J_\rho$, and put $\Pi(\pi^0, \pi^1) = \text{Ind}_{S([\rho])}^{\hat{U} \rtimes S([\rho])}(\pi^0 \boxtimes \pi^1)$. We give a simple proof that $\Pi(\pi^0, \pi^1)$ is irreducible and that any IR of $G$ is equivalent to some of $\Pi(\pi^0, \pi^1)$.

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