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Irreducibility of induced modules for general linear supergroups

We determine when is an induced module $H^0_G(\lambda)$, corresponding to the highest weight $\lambda$ and the general linear supergroup $G = GL(m|n)$ irreducible. The answer uses the description of irreducible Specht modules given by Fayers and a characterization of induced $G$-modules given by Zubkov. In the (easier) case of characteristic zero this provides the converse of the factorization formula for hook Schur functions given by Berele and Regev.