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Moduli spaces for off-shell supersymmetry

In physics, an on-shell representation of the Poincaré group is a space of sections over a covector orbit. An off-shell representation is, in contrast, an action of the Poincaré group on functions over the entire covector space. Extending to the super Poincaré group, on-shell representations can be classified via a supersymmetric extension of Wigner's method. However, there is no known classification of supersymmetric off-shell representations.

Restricting to the super Poincaré group for one spacetime dimension, off-shell representations correspond to filtered Clifford supermodules. We introduce a notion of equivalence between off-shell representations of supersymmetry and use it to construct moduli spaces of such representations. These moduli spaces are quotients of certain flag manifolds on spin representations by the actions of the corresponding spin groups, and we will present the low dimensional examples. We will also discuss the corresponding problem for compact Lie groups, replacing covector orbits with coadjoint orbits.