Particle Symmetries Problem Set 1 (2014)

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Representation Polygons

1. Draw the polygon diagrams of the following representations of $Sp(2)$, find the different Weyl orbits, and compute the multiplicities of each weight in the representation. Give names to each of these representations: Once as representations of $Sp(2)$ and once as representations of $SO(5)$.

   (a) $[1,0]$,

   (b) $[0,1]$,

   (c) $[2,0]$,

   (d) $[1,1]$,

   (e) $[0,2]$,

   (f) $[3,0]$,

   (g) $[2,1]$,

   (h) $[1,2]$,

   (i) $[0,3]$.

2. Find the multiplicity law for the weights of the $[n_1,n_2]$ representation of $Sp(2)$.

3. For each of the cases in (1) compute the character of the irreducible representation.