Presenting a relatively simpler method than the tensor method for calculating the diagonal generators of higher representations of Lie groups to calculate the quark potentials in the thick centervortex model

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Abstract

One of the successful models in describing the quark phenomenon is the thick center vortex model. In this model, confinement is attributed to the group's non-trivial centers. The non-trivial centers of the gauge group are also the reason of the presence of vortices. Vortices are point-like soliton structures in two dimensions and line like in three dimensions. In this model we need the diagonal generators of the group representations to calculate and plot a quark potential diagram in different representation. It is common to use the tensor method to calculate these diagonal generators, which requires a lot of calculations. In this paper after introducing the thick center vortex model, the tensor method is introduced. Then the concept of root and weight diagram in Lie groups is introduced. Using the root and weight diagram an efficient and simple method for calculating the diagonal generators of group representations is presented. The groups studied in this article are SU (2) and SU (3), which can be extended to other groups..

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