Lattice Formulation of $\text{N}=4 \ D=3$ Twisted Super Yang-Mills

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We propose a lattice formulation of three dimensional super Yang-Mills model with twisted $\text{N}=4$ supersymmetry. The method we employ is a three dimensional extension of manifestly gauge covariant method which was developed in our previous proposal of Dirac-Kahler twisted $\text{N}=2$ super Yang-Mills on two dimensional lattice. As in the case of two dimensional formulation, the lattice generically consists of fermionic links, where odd Grassmann variables, supercharges and fermionic connections are located, as well as bosonic links where bosonic gauge link variables are sitting on. The crucial point is that the supersymmetry algebra of twisted $\text{N}=4 \ D=3$ satisfies the Leibniz rule on three dimensional lattice, which allows us to stand on a manifest gauge covariant treatment based the formulation of link supercharges and the use of “shifted” (anti-)commutators.