

EXTENDED OBJECT SUPERALGEBRAS

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Superalgebras (graded Lie algebras) were introduced in the physics of particles and fields in several contexts. In dual string models Neveu-Schwarz-Ramond superalgebras were applied as "supergauge" conditions and were essential in the removal of divergences. The spinning Nambu-Goto dual string action is $SL(2,R) \simeq SU(1,1)$ invariant. If we consider the components of the spinorial and tensorial unitary (infinite-dimensional) $SL(2,R)$ irreducible tensor operators and demand the super (graded) Jacobi identities, we obtain (by making use of the algebraic methods only) the Neveu-Schwarz-Ramond superalgebras.

In order to develop the theories of a spinning membrane and/or a spinning lump (three- and four-dimensional extended object embeded into the four-dimensional Minkowski space), as well as the supersymmetric version of a $GA(4,R)$ gauge theory, we have constructed explicitly the superalgebraic extensions of the $SL(3,R)$ and $SL(4,R)$ algebras. These superalgebras are generated by the $SL(n,R)$ $n=3,4$ generators themselves and by the two infinite sets of spinorial and tensorial operators which transform mutually as components of the $SL(n,R)$ $n=3,4$ multiplicity free (ladder) irreducible tensor operators.

Y. Ne'eman and Dj. Šijački, J. Math. Phys. 21(1980)1312.

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