On elliptic deformation of W_N algebras

E. Ragoucy [1], J. Avan[2], L. Frappat[1]

[1] LAPTh (Annecy Laboratory for Theoretical Physics), CNRS-USMB, 74000 Annecy, France

[2] LPTM, University of Cergy-Pontoise

We revisit the construction of deformed Virasoro algebras from elliptic quantum algebras of vertex type, generalizing the bilinear trace procedure proposed in the 90's. It allows us to make contact with the vertex operator techniques that were introduced separately at the same period by Jimbo et al. The case of dynamical elliptic quantum algebras is also studied.

Then, we extend our method to q-deformations of quantum W_N algebras with elliptic structure functions. Their generators of spin k+1 are built from $2k$ products of the Lax matrix generators of $A_{q,p}(gl(N)_c)$). The closure of the algebras is insured by a critical surface condition relating the parameters p, q and the central charge c. Further abelianity conditions are determined, either as $c = -N$ or as a second condition on p, q, c. When abelianity is achieved, a Poisson bracket can be defined, that we determine explicitly. One connects these structures with previously built classical q-deformed W_N algebras and quantum $W_{q,p}(sl_N)$.

References

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