

CONTRACTIONS AND CENTRAL EXTENSIONS OF QUANTUM WHITE
NOISE LIE ALGEBRAS

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Abstract: We show that the Renormalized Powers of Quantum White Noise Lie algebra $RPQWN_*$, with the convolution type renormalization $\delta^n(t-s) = \delta(s)\delta(t-s)$ of the $n \geq 2$ powers of the Dirac delta function, can be obtained through a contraction of the Renormalized Powers of Quantum White Noise Lie algebra $RPQWN_c$ with the scalar renormalization $\delta^n(t) = c^{n-1}\delta(t)$, $c > 0$. Using this renormalization, we also obtain a Lie algebra $W_\infty(c)$ which contains the w_∞ Lie algebra of Bakas and the Witt algebra as contractions. Motivated by the W_∞ algebra of Pope, Romans and Shen, we show that $W_\infty(c)$ can also be centrally extended in a non-trivial fashion. In the case of the Witt subalgebra of W_∞ , the central extension coincides with that of the Virasoro algebra.

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