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Exponential formulas and Lie algebra type star products. (English) Zbl 1248.81092
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Summary: Given formal differential operators F_i on polynomial algebra in several variables x_1, \dots, x_n , we discuss finding expressions K_l determined by the equation $\exp(\sum_i x_i F_i)(\exp(\sum_j q_j x_j)) = \exp(\sum_l K_l x_l)$ and their applications. The expressions for K_l are related to the coproducts for deformed momenta for the noncommutative space-times of Lie algebra type and also appear in the computations with a class of star products. We find combinatorial recursions and derive formal differential equations for finding K_l . We elaborate an example for a Lie algebra $su(2)$, related to a quantum gravity application from the literature.

MSC:

- 81R60 Noncommutative geometry in quantum theory
- 16S30 Universal enveloping algebras of Lie algebras
- 16S32 Rings of differential operators (associative algebraic aspects)
- 83C45 Quantization of the gravitational field
- 83C65 Methods of noncommutative geometry in general relativity

Cited in **6** Documents

Keywords:

star product; exponential expression; formal differential operator

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