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ALGEBRAIC PROPERTIES OF COVARIANT DERIVATIVE AND COMPOSITION OF EXPONENTIAL MAPS

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We consider the problem of calculating the Taylor series for a function $h_x\, T_xX \times T_xX \to T_xX$ defined by the composition of exponential maps, where X is a smooth manifold with affine connection and $x \in X$. We show that the homogeneous summands of such a series can be derived by applying the Lie bracket and covariant derivative to the arguments of the function which are extended to vector fields.

Key words and phrases: affine connection, composition of exponential maps, nonassociative algebra.

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