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**Formal exponential map for graded manifolds.** (English) Zbl 07130853

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The principal objective in this paper is to introduce, for every  $\mathbb{Z}$ -graded manifold, a formal exponential map in a purely algebraic way and investigate its properties with applications. Although the geodesic exponential map  $\exp : T_M \rightarrow M \times N$  associated to an affine connection  $\nabla$  on a smooth manifold  $M$  fails to transpose straightforwardly to the graded manifold context, its fiber-wise infinite-order jet evaluated along the zero section of  $T_M$  admits a genuinely algebraic description carrying over to the  $\mathbb{Z}$ -graded context. It is established (Theorem 4.3) that the formal exponential map  $\text{pbw} : \Gamma(S(T_M)) \rightarrow \mathcal{U}(T_M)$  is an isomorphism of filtered coalgebras over  $\mathcal{C}^\infty(M)$ . As applications, a much more transparent proof of the Emrich-Weinstein theorem [*C. Emrich* and *A. Weinstein*, Prog. Math. 123, 217–239 (1994; [Zbl 0846.58031](#))] for graded manifolds and a proof based on homological perturbation of an analog of *V. Dolgushev's* result in [Adv. Math. 191, No. 1, 147–177 (2005; [Zbl 1116.53065](#))] using *B. V. Fedosov's* iterative method [J. Differ. Geom. 40, No. 2, 213–238 (1994; [Zbl 0812.53034](#))] in the context of  $\mathbb{Z}$ -graded manifold are given.

Reviewer: [Hirokazu Nishimura \(Tsukuba\)](#) (MR 3910470)

**MSC:**

[58C50](#) Analysis on supermanifolds or graded manifolds

**Full Text:** [DOI](#)