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Mackenzie, Kirill [[Mackenzie, Kirill Charles Howard](#)] (4-SHEF-SM)

★**Proving the Jacobi identity the hard way.** (English summary)

Geometric methods in physics, 357–366, *Trends Math.*, Birkhäuser/Springer, Basel, 2013.

It was established in [H. Nishimura, *Internat. J. Theoret. Phys.* **36** (1997), no. 5, 1099–1131; [MR1452238](#)] that the Jacobi identity of vector fields is supported by a more fundamental identity of a combinatorial character called the *general Jacobi identity* within the framework of synthetic differential geometry [cf. A. B. Kock, *Synthetic differential geometry*, second edition, London Math. Soc. Lecture Note Ser., 333, Cambridge Univ. Press, Cambridge, 2006; [MR2244115](#)]. The discovered identity was given a more streamlined proof in [H. Nishimura, *Internat. J. Theoret. Phys.* **38** (1999), no. 8, 2163–2174; [MR1709033](#)]. The identity was given a mechanical proof by using Gröbner bases in [H. Nishimura and T. Osoekawa, *Internat. J. Theoret. Phys.* **46** (2007), no. 11, 2843–2862; [MR2363761](#)]. Nishimura has shown in [Far East J. Math. Sci. (FJMS) **35** (2009), no. 1, 33–48; [MR2572788](#)] that the general Jacobi identity together with the double dualization functor in a cartesian closed category gives rise to a combinatorial proof of the Jacobi-like identity of tangent-vector-valued differential forms discovered and established algebraically in [A. Frölicher and A. Nijenhuis, *Nederl. Akad. Wetensch. Proc. Ser. A.* **59** = *Indag. Math.* **18** (1956), 338–359; [MR0082554](#)] and [A. Nijenhuis, *Nederl. Akad. Wetensch. Proc. Ser. A.* **58** = *Indag. Math.* **17** (1955), 390–397, 398–403; [MR0074879](#)]. The paper under review rediscovers the general Jacobi identity in somewhat different guise.

{For the collection containing this paper see [MR3379709](#)}

Hirokazu Nishimura