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Abstract

Extending the Campbell-Hausdorff multiplication

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In the Lie Theory of groups and semigroups, one sometimes needs an analytic extension of the locally defined Campbell-Hausdorff multiplication onto much larger domains (cf. e.g. [2]). The following Theorem generalizes an old result by Dixmier [1] significantly. Its proof, which uses a method different from that of Dixmier, will appear in [3].

Theorem . *Let* $\mathfrak{g}$ *be a finite dimensional real Lie algebra and* $\mathfrak{j}$ *an ideal of* $\mathfrak{g}$. *Assume that for* $x \in \mathfrak{j}$ *the mapping* $\operatorname{ad} x|\mathfrak{j}$ *does not have an eigenvalue contained in* $2\pi i\mathbb{Z} \setminus \{0\}$. *Then there is an open ball* V *around* 0 *in* $\mathfrak{g}$ *and an analytic extension* $\circ : (\mathfrak{j} + V) \times (\mathfrak{j} + V) \to \mathfrak{g}$ *of the* Campbell-Hausdorff-*multiplication.* ■

References

[1] Dixmier, J., *L'application exponentielle dans les groupes de Lie résolubles,* Bull. Soc. Math. France **85** (1957), 113–121.

[2] Eggert, A., „Über LIEsche Semialgebren“, Mitteilungen aus dem Mathematischen Seminar Gießen **204** (1991), iv+91pp.

[3] Eggert, A., *Extending the Campbell-Hausdorff multiplication,* Geometriae Dedicata, to appear.

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