

**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  $\text{ad } x|_{\mathfrak{j}}$  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  $\circ : (\mathfrak{j} + V) \times (\mathfrak{j} + V) \rightarrow \mathfrak{g}$  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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