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Dimitrov, Georgi K.; **Mladenov, Ivaïlo M.**

A new formula for the exponents of the generators of the Lorentz group. (English)

Zbl 1098.22008

Mladenov, Ivaïlo (ed.) et al., Proceedings of the 7th international conference on geometry, integrability and quantization, Sts. Constantine and Elena, Bulgaria, June 2–10, 2005. Sofia: Bulgarian Academy of Sciences (ISBN 954-8495-30-9/pbk). 98-115 (2006).

The level of this paper is quite elementary. The authors show that any matrix in the Lie algebra $\mathrm{so}(3,1)$ of the Lorentz group $\mathrm{SO}(3,1)$ can be mapped via an inner automorphism into a matrix which is of much simpler form. Then the authors obtain a formula for the exponent $\exp X$ of an arbitrary matrix X in $\mathrm{so}(3,1)$. As an application, the authors determine the trajectories of a particle with mass m which carries an electric charge e in a constant electromagnetic field specified by a matrix X in $\mathrm{so}(3,1)$.

For the entire collection see [Zbl 1089.53004].

Reviewer: Benjamin Cahen (Metz)

MSC:

22E43 Structure and representation of the Lorentz group
22E70 Applications of Lie groups to the sciences; explicit representations
70B05 Kinematics of a particle

Cited in **1** Document

Keywords:

Lorentz group; exponent of a matrix; trajectories of a particle

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