1067-22-1404   **Maria Gordina**, **Leonard Gross*** (`gross@math.cornell.edu`) and **S. G. Rajeev**. *Another approach to Lie's third theorem in infinite dimensions.*

The proof of Lie's third theorem by Duistermaat and Kolk (2000) produces a Lie group G with given Lie algebra $\mathfrak{g}$ by constructing G as a quotient of a group of paths into $\mathfrak{g}$ modulo a subgroup of this path group.

Spaces of paths into a Lie algebra have been used in a number of diverse settings, including heat kernel analysis on Lie groups, control theory for rough paths, and K.T. Chen forms and their applications. Each of these studies encodes a given path as an element of a tensor algebra over $\mathfrak{g}$. We are going to use this encoding, along with natural heat kernel norms on the tensor algebra, to give another proof of Lie's third theorem, applicable to some infinite dimensional Lie algebras. This improves on the authors' previous approach. (Received September 20, 2010)