

Operations and Actions of Lie Groups on Manifolds

Sharmin Akter¹, Mir Md. Moheuddin^{1*}, Saddam Hossain², Asia Khatun¹

¹Department of CSE (Mathematics), Atish Dipankar University of Science and Technology (ADUST), Dhaka, Bangladesh

²Department of Basic Science (Mathematics), World University of Bangladesh (WUB), Dhaka, Bangladesh

Email: Sharmin2005@gmail.com, mirmddmoheuddinkhan@gmail.com, s.hossain656@gmail.com, asiakhatun33@yahoo.com

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Abstract

As recounted in this paper, the idea of groups is one that has evolved from some very intuitive concepts. We can do binary operations like adding or multiplying two elements and also binary operations like taking the square root of an element (in this case the result is not always in the set). In this paper, we aim to find the operations and actions of Lie groups on manifolds. These actions can be applied to the matrix group and Bi-invariant forms of Lie groups and to generalize the eigenvalues and eigenfunctions of differential operators on $\mathbb{R}^n$. A Lie group is a group as well as differentiable manifold, with the property that the group operations are compatible with the smooth structure on which group manipulations, product and inverse, are distinct. It plays an extremely important role in the theory of fiber bundles and also finds vast applications in physics. It represents the best-developed theory of continuous symmetry of mathematical objects and structures, which makes them indispensable tools for many parts of contemporary mathematics, as well as for modern theoretical physics. Here we did work flat out to represent the mathematical aspects of Lie groups on manifolds.

Keywords

Group (G), Abelian Group ($g_1g_2 = g_2g_1$), Subgroup (H is a Subgroup of G), Co-Sets (gH), Lie Groups ($G \times G \rightarrow G(x, y) \mapsto x \cdot y$ and $G \rightarrow G, g \mapsto g^{-1}$), Smooth Mapping ($\sigma: G \times G \rightarrow G$)

1. Introduction

In the present era, the study of the group related to the Lie group is essential for the sake of its comprehensive applications in several fields. Through the mathematical analysis, representations of groups on the manifold are vital due to its al-

Manifolds And Lie Groups

Joachim Hilgert, Karl-Hermann Neeb



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Manifolds and Lie Groups J. Hano, H. Ozeki, K. Okamoto, S. Murakami, A. Morimoto, 2013-06-29 This volume is the collection of papers dedicated to Yozo Matsushima on his 60th birthday which took place on February 11, 1980. A conference in Geometry in honor of Professor Matsushima was held at the University of Notre Dame on May 14 and 15, 1980. Some of the papers in this volume were delivered on this occasion. 00015 S Kobayashi University of Tokyo 27 R Ogawa Loyola University Chicago 42 P Ryan Indiana University 1 W Stoll 2 W Kaup University of California at Berkeley University of Chicago University of South Bend 16 B Y Chen 28 A Howard 43 M Kuga SUNY at Stony Brook 3 G Shimura Michigan State University 29 D Blair Stony Brook Princeton University 17 G Ludden Michigan State University 44 W Higgins 30 B Smyth 4 A Borel Institute for Michigan State University 45 J Curry Advanced Study 18 S Harris 31 A Pradhan 46 D Norris 32 R Escobales 5 Y Matsushima University of Missouri 47 J Spellecy Canisius College 6 Mrs Matsushima 19 J Beem 48 M Clancy 7 K Nomizu University of Missouri 33 L Smiley 49 J Rabinowitz University of Illinois at Chicago 20 D Collins 34 C H Sung Brown University of Valparaiso 35 M Markowitz 8 J 1 Hano 50 R Richardson Australian Washington University 36 A Sommese 21 I Satake University of California at Berkeley 37 A Vitter 9 J Carrell University of Michigan 51 D Lieberman 22 H **Manifolds and Lie Groups , Infinite-Dimensional Lie Groups** Hideki Omori, 2017-11-07 This book develops from the viewpoint of abstract group theory a general theory of infinite dimensional Lie groups involving the implicit function theorem and the Frobenius theorem.

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The Enigmatic Realm of **Manifolds And Lie Groups**: Unleashing the Language is Inner Magic

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