

## Accepted Manuscript

Lie symmetry approach for The Vlasov-Maxwell system of equations

Saeede Rashidi, S. Reza Hejazi

PII: S0393-0440(18)30135-9

DOI: <https://doi.org/10.1016/j.geomphys.2018.04.014>

Reference: GEOPHY 3219

To appear in: *Journal of Geometry and Physics*

Received date: 15 March 2018

Accepted date: 30 April 2018

Please cite this article as: S. Rashidi, S. Reza Hejazi, Lie symmetry approach for The Vlasov-Maxwell system of equations, *Journal of Geometry and Physics* (2018), <https://doi.org/10.1016/j.geomphys.2018.04.014>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Lie symmetry approach for The Vlasov-Maxwell system of equations

Saeede Rashidi<sup>a,\*</sup>, S. Reza Hejazi<sup>b</sup>

<sup>a</sup>*Faculty of Mathematical Sciences, Shahrood University of Technology, Shahrood, Semnan, Iran.*

<sup>b</sup>*Faculty of Mathematical Sciences, Shahrood University of Technology, Shahrood, Semnan, Iran.*

---

## Abstract

The present paper is intended for the investigation of the fractional integro-differential system called Vlasov-Maxwell system. The method is based on using the geometric vector fields of the symmetries. This system arises for interaction of charged particles in plasma. The fractional derivative is considered in both the Caputo and Riemann-Liouville sense. Under some suitable conditions, we construct the infinitesimal criterion of invariance for detecting Lie symmetries of these equations. In this study, Lie symmetry method for constructing the similarity solutions of the considered system is implemented. The theory is constructed step by step and carefully to apply in the Vlasov-Maxwell system.

*Keywords:* Fractional integro-differential equation, Fractional derivative, Lie symmetry, Invariant solution.

*2010 MSC:* 34A08, 35R11, 26A33, 58D19, 70S10.

---

## 1. Introduction

Fractional differential equations (FDEs) have many applications in various fields of engineering and science, for example vibration, viscoelasticity, control and electromagnetic theory. As a matter of fact, fractional derivatives provide an

---

\*Corresponding author  
Email addresses: saeederashidi@shahroodut.ac.ir (Saeede Rashidi),  
ra.hejazi@gmail.com (S. Reza Hejazi)

Download English Version:

<https://daneshyari.com/en/article/8255316>

Download Persian Version:

<https://daneshyari.com/article/8255316>

[Daneshyari.com](https://daneshyari.com)