

# PERMANENT SOLUTIONS FOR SOME AXIAL MOTIONS OF GENERALIZED BURGERS FLUIDS IN CYLINDRICAL DOMAINS\*

Constantin Fetecau<sup>†</sup>    Corina Fetecau<sup>‡</sup>    Shehraz Akhtar<sup>§</sup>

## Abstract

Closed form permanent solutions are determined for two types of oscillating motions of generalized Burgers fluids through an infinite annulus. These solutions, presented in simple forms in terms of some modified Bessel functions, are periodic in time and independent of the initial conditions. They satisfy boundary conditions and governing equations and can easily be reduced to the solutions of Burgers, Oldroyd-B, Maxwell, second grade and linearly viscous fluids performing the same motions. Further, the solutions corresponding to motions through an infinite circular cylinder are obtained as limiting cases of previous solutions and some graphical representations are included.

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**keywords:** permanent solutions; axial motions; generalized Burgers fluid.

## 1 Introduction

Exact solutions for different initial-boundary value problems are important for many reasons. Such solutions, in addition to serve as approximations

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<sup>†</sup>c.fetecau@yahoo.com Academy of Romanian Scientists, 050094 Bucuresti, Romania and Technical University of Iasi, Romania, Department of Mathematics

<sup>‡</sup>Technical University of Iasi, Romania, Department of Theoretical Mechanics

<sup>§</sup>Abdus Salam School of Mathematical Sciences, GC University, Lahore 54600, Pakistan