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UNSTEADY MHD FLOW OF A GENERALIZED VISCO-ELASTIC OLDROYDIAN FLUID

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ABSTRACT : The aim of this paper is to study the unsteady MHD flow of generalised visco-elastic fluids through a porous rectangular duct. From this generalised investigation we have deduced the different problems of flow in cases of oldroyd first order, second order, n-th order fluids ; Maxwell first order, second order, n-th order fluids ; Rivlin-Ericksen first order, second order, n-th order fluids and ordinary viscous fluid.

The numerical calculation of the velocity profile for oldroyd fluid has been made in the forms of tables and graphs.

INTRODUCTION

The development of hydrodynamic motion of inviscid and viscous liquids has been presented in the informative works of Lamb (1), Milne-Thomson (2), Batchelor (3), Landau and Lifshitz (4) and others (5,6,7). Various hydromagnetic problems and the corresponding development of the theories will be found in the monographs of Cowling (8), Ferraro and Plumpton (9); Cabannes (10), Jeffrey (11) and others (12,13,14). The hydrodynamic and hydromagnetic stability problems were considered by Chandrasekhar (15) and Lin (16).

There are circumstances to consider a large variety of continua in which considerable impetus is given to the development of rheology as a science covering a wide range of study of material properties exhibiting both the properties of ideal