

Some exact solutions for the rotational flow of a generalized second grade fluid between two circular cylinders

Amir Mahmood^{1,*}, Saifullah¹, Georgiana Bolat²,

¹*Abdus Salam School of Mathematical Sciences, GC University, Lahore, PAKISTAN*

²*Technical University of Iasi, R-6600 Iasi, ROMANIA*

Abstract

The velocity field and the associated tangential stress corresponding to flow of a generalized second grade fluid between two infinite coaxial circular cylinders, are determined by means of the Laplace and Hankel transforms. At time $t = 0$ the fluid is at rest and at $t = 0^+$ cylinders suddenly begin to rotate about their common axis with a constant angular acceleration. The solutions that have been obtained satisfy the governing differential equations and all imposed initial and boundary conditions. The similar solutions for a second grade fluid and Newtonian fluid are recovered from our general solutions. The influence of the fractional coefficient on the velocity of the fluid is also analyzed by graphical illustrations.

*Corresponding author.

E-mail address: amir4smsgc@gmail.com (Amir Mahmood).

¹Permanent Address :

Abdus Salam School of Mathematical Sciences, GC University, Lahore, PAKISTAN.