Analele **Univ**ersităţii **Bucureşti**, **Mat**ematică
Anul LV(2006) pp. 129–138

Dedicated to Professor LAZĂR DRAGOŞ on his 75^{th} birthday

Existence / Non-existence of Acceleration Waves in Third Grade Fluids

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December 20, 2005

Abstract - This paper deals, in the first part, with the existence of harmonic waves in polynomial third grade fluids. The main results (part two), based on some older remarks of the author (see Tigoiu [6]), concern the existence / non-existence for propagation of some discontinuities like spherical and cylindrical acceleration waves (all important cases referring to the signum of the constitutive coefficient α_1). It was proved that, in both cases considered here, there is at least one solution of the problem. That is the discontinuities can propagate. It was discussed some situations in which some of the two solutions does not exists or leads to solutions which tend to ∞ when the time $t \longrightarrow \infty$, like in the case of a linear viscous fluid.

Key words and phrases : propagation of singularities, harmonic waves, third grade fluids, acceleration waves

Mathematics Subject Classification (2000) **:** 76A05, 76D33, 76A99