SM15S_12567

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Soft Porous Media Model of Magnetic Fluid

Mariusz Kaczmarek[(1)], Tomasz Hornowski[(2)]

(1) *Bydgoszcz University, Bydgoszcz, Poland*
(2) *Adam Mickiewicz University, Poznań, Poland*

An interesting intelligent materials are magnetic fluids in which under influence of magnetic field certain amount of colloidal particles forms clusters which join into chains. The presence of chains induces stiffness and mechanical anisotropy. In order to describe the properties and incorporate interactions between clusters and surrounding liquid a model of soft porous media is considered. It is assumed that the two phases are the skeleton made of chains and the liquid composed of carrier liquid with free particles. The interactions between clusters are represented through components of stress tensor for the solid phase. The interactions of clusters with liquid are expressed as the sum of viscous, inertial and Basset force. Given the assumed symmetry of the medium (transversal isotropy) the harmonic wave studied and dependence of wave parameters on strength of magnetic field, angle between directions of magnetic field and wave, and on frequency are compared with experimental data.

View the extended summary