In Memoriam Adelina Georgescu

AN APPLICATION OF DOUBLE-SCALE METHOD TO THE STUDY OF NON-LINEAR DISSIPATIVE WAVES IN JEFFREYS MEDIA[*]

Adelina Georgescu[†]   Liliana Restuccia[‡]

Abstract

In previous papers we sketched out the general use of the double-scale method to nonlinear hyperbolic partial differential equations (PDEs) in order to study the asymptotic waves and as an example the model governing the motion of a rheological medium (Maxwell medium) with one mechanical internal variable was studied. In this paper the double scale method is applied to investigate non-linear dissipative waves in viscoanelastic media without memory of order one (Jeffreys media), that were studied by one of the authors (L. R.) in more classical way. For these media the equations of motion include second order derivative terms multiplied by a very small parameter. We give a physical interpretation of the new (fast) variable, related to the surfaces across which the solutions or/and some of their derivatives vary steeply. The paper concludes with one-dimensional application containing original results.

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