UNIVERSITÀ DI TRENTO

Stroh/Hamiltonian formulation for complex media

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Room	**2R, DICAM Mesiano**

It is perhaps not widely known that the celebrated Stroh formalism owns its outstanding structure to the fact that it represents the canonical form of the governing equations, once any space variable is treated in the fashion a time variable would when moving from the Lagrangian to the Hamiltonian formalism. Generally, in this process, the selected space variable represents the direction of propagation of waves and accordingly the new formalism is especially suited to investigate this kind of problems. More importantly, the Hamiltonian structure brings over a number of closure relations which would be very difficult to determine from the standard formulation. In this communication, we show how the equations governing complex media can be brought in Hamiltonian form. Instead of putting in guesswork, we adopt the systematic derivation of the Hamiltonian formalism and this will help us identify the correct conjugate momenta which lend the problem its canonical form. For couple stress media, which are constrained second gradient elastic materials, the resulting canonical formalism appears in the form of a Differential Algebraic system of Equations(DAE).This is then recast in a 7-dimensional coupled linear system of differential equations. The antiplane problem is especially interesting, for it shows remarkable similarity with the theory of anisotropic plates. Yet, unlike for plates, a classical Stroh formulation cannot be obtained, owing to the difference in the constitutive assumptions.This notwithstanding, the canonical formalism brings a fresh insight into the problem's structure and emphasizes important symmetry properties.

The seminar is organized by the Solid and Structural Mechanics Group
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