Long Wavelength Defect Evaluation

J. R. Rice
Brown University

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ABSTRACT

This is a summary of work with B. Budiansky and W. Kohn on the interpretation of long wavelength scattered fields from defects. The maximum information content of the long-wavelength fields is shown to consist of 22 parameters, one of which is the excess mass $\delta M$, and 21 of which are determined by the excess elastic moduli tensor $\delta C$ and quasi-static response properties of the defect region. It is shown that these parameters can, in principle, be determined by longitudinal to longitudinal wave scattering experiments only, and that they can provide evidence, necessarily incomplete, on the type, shape, orientation, and size of the defect. Particularly, when the defect is in the form of a planar crack, it is shown that the crack orientation can be determined and that an approximate estimate can be made of the maximum stress intensity factor that would be induced by tensile stresses acting normal to the defect plane.

References
