

MECHANICAL & INDUSTRIAL ENGINEERING COLLOQUIUM

New perspectives in Elasticity

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11:30 am to 12:45 pm, Friday, April 17, 2015

224 MEC

Abstract

In this talk I assert that the usual interpretation of what one means by “elasticity” is much too insular and illustrate my thesis by introducing implicit constitutive theories that can describe the non-dissipative response of solids. I show that response which was hitherto untenable within the context of Cauchy or Green Elasticity are not only possible, they can explain phenomena that have thus far defied explanation. There is another important aspect to the introduction of such an implicit approach to the non-dissipative response of solids, namely the development of a hierarchy of approximations wherein, while the strains are infinitesimal or have a limiting value, the relationship between the stress and the linearized strain could be non-linear. The generalization lends itself very well to the fracture of brittle elastic solids. The generalization also can be used to describe the response of metallic alloys such as Gum metal which exhibit non-linear relationship between the strain and the stress in the small strain regime.

Biography

Prof. Rajagopal holds a University Distinguished Professorship, Regents Professorship and the Forsyth Chair in Mechanical Engineering. He also holds joint appointments in the Departments of Mathematics, Biomedical Engineering, Chemical Engineering and Civil Engineering at Texas A&M University. He is a Senior Scientist at the Texas Transportation Institute. Prof. Rajagopal has received numerous awards including the Eringen Medal from the Society of Engineering Science and the Archie Higdon Award from the American Society of Engineering Education. He is a highly cited researcher according to the ISI Web of Science, has received several honorary doctorates and serves on the editorial board of over thirty journals in Mechanics and Applied Mathematics..

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