Differential geometric formulation of the Cauchy Navier equations

Frank Schadt

(Submitted on 1 Jun 2011 (v1), last revised 7 Jun 2011 (this version, v3))

The paper presents a reformulation of some of the most basic entities and equations of linear elasticity - the stress and strain tensor, the Cauchy Navier equilibrium equations, material equations for linear isotropic bodies - in a modern differential geometric language using differential forms and lie derivatives. Similar steps have been done successfully in general relativity, quantum physics and electrodynamics and are of great use in those fields. In Elasticity Theory, however, such a modern differential geometric approach is much less common. Furthermore, existing reformulations demand a vast knowledge of differential geometry, including nonstandard entities such as vector valued differential forms and the like. This paper presents a less general but more easily accessible approach to using modern differential geometry in elasticity theory than those published up to now.

Subjects: **Mathematical Physics (math-ph)**
Cite as: **arXiv:1106.0130 [math-ph]**
(or **arXiv:1106.0130v3 [math-ph]** for this version)

Submission history

From: Frank Schadt [view email]
[v1] Wed, 1 Jun 2011 09:45:01 GMT (6kb)
[v2] Fri, 3 Jun 2011 14:58:46 GMT (6kb)
[v3] Tue, 7 Jun 2011 10:05:37 GMT (6kb)

Which authors of this paper are endorsers?