

REVIEWER's REPORT

on the article

“A magneto-electro-elastic-visco-plastic problem with subdifferential contact condition”

(author: Abderrezak Kasri)

submitted for publication in *Siberian Electronic Mathematical Reports*

The article written by A. Kasri is devoted to construction of the theory of existence and uniqueness of solutions for the mathematical model describing a quasistatic behavior of a body under the set of combined multi-physical effects. This model is semilinear by nature. Its integro-differential formulation, called Problem 3 in the article, consists of a set of time-dependent integro-differential magneto-electro-elastic-visco-plastic constitutive laws, the differential balance equations for the stress, electric displacement, and magnetic induction fields, the boundary conditions on the edge of the body, and the initial conditions for the solution.

The author builds a functional framework for the problem under study and accordingly sets the variational formulation, called Problem 5 in the article. For Problem 5, under an additional smallness condition, the author formulates and proves a theorem on existence and uniqueness of weak solutions. The smallness condition reflects the fact that the elastic stiffness heavily dominates over nonlinear effects of mutual electric, magnetic, elastic, etc. interactions. This theorem is the main result of the article. Its proof is based on reliable methods in the theory of pseudo-monotone operators and the fixed point theory in Banach spaces.

The general impression of the article is positive. In introduction, the author presented a fairly exhaustive overview of the literature on the topic and pointed on the place of the proposed work in this row. The outline of the article is consistent and clear. The proofs look correct.

I believe that the article may be of interest to specialists in the field of partial differential equations, calculus of variations and mathematical modeling in elasticity.

There are several minor shortcomings that should be fixed before publication. They are as follows.

1. Page 9: This would be appropriate to emphasize that (15) is the Signorini condition, as far as the Signorini condition was mentioned in Abstract and Introduction.
2. Page 9, Example 4. Presence of the ball $\bar{B}(0, 1)$ looks redundant, since the construction of the example does not involve $\bar{B}(0, 1)$.
3. Page 10: typo was found in the name of Friedrichs–Poincaré's inequality.
4. Pages 11-12: $\mathcal{C}(x, w)_i$, $\mathcal{E}(x, w)_i$, $\mathcal{Z}(x, w)_i$, $\mathcal{M}(x, w)_i$, and $\mathcal{S}(x, w)_i$ do not look good in (25)–(31) in view of (1)–(3). Looks like it would be better to write $(\mathcal{C}w)_i$, $(\mathcal{E}w)_i, \dots$ instead.
5. Page 13, formula (35): typo was found in “Lipschitz”.

Based on what is written above, I recommend the article “A magneto-electro-elastic-visco-plastic problem with subdifferential contact condition”, written and presented by Abderrezak Kasri, for publication in “Siberian Electronic Mathematical Reports” after corrections have been done in connection with the comments made.