Report on PhD thesis manuscript to be defended
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The report presented by Mr. Juan Carlos Lopez Realpozo with the aim to obtain the PhD in mathematics is entitled ”CARACTERIZACIÓN MICROMECÁNICA DE COMPUESTOS CON CONDICIONES DE CONTACTO IMPERFECTO”. It is written in Spanish.

Before speaking about the contents, I am going to begin this report with some elements on the shape of the manuscript. It is a document of about 127 pages. It consists in a general introduction, three chapters, a conclusion and two appendices.
The aim of this work is to study the homogenization of piezoelectric periodic composite materials with mechanic and electric imperfect contacts. This problem is very interesting from the mathematical and mechanical points of view and also from the engineering point of view.

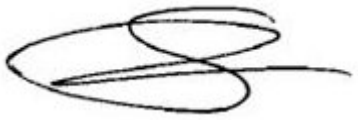
Further to a brief introduction which replaces this study in its context and presents the state-of-the-art, the first chapter is a bibliographical analysis and allows general concepts and basic equations related to piezoelectric materials; description of elementary cell is committed; an explanation on different types of contact at the interface of composites is given

In the second chapter the Asymptotic Homogenization Method (AHM) is used for deriving local problems and the solution of nine local problems is found. The analytical expressions of the effective coefficients considering imperfect contact (mechanic and electric) between the constituents of the composite are obtained.

In the third chapter, presentation and analysis of the numerical results derivate by AHM are given. Validations, comparisons and interpretations of the results are performed (in particular on various geometries).

In conclusion, the results obtained are very interesting; they show a large knowledge of the subject seen from the mathematical point of view. It seems to the referee that this work allowed a step in the field of the homogenization of piezoelectric periodic composite materials with mechanic and electric imperfect contacts.

The referee expresses a positive opinion and agrees that Mr. Juan Carlos Lopez Realpozo defends his works in order to obtain the PhD degree in Mathematics of La Havana University.



Marseille, 2012, June 28

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