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Finite element modeling and analysis of electromagnetic field distribution for different shapes of metallic materials

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ABSTRACT:

In aeronautical industry, diversity of used materials, dimensions and complexity of the parts require a specific treatment in order to fulfilling the requirements of safety and reliability. In this paper, electromagnetic problem modeling is developed in order to realize a data-processing application able to calculate electromagnetic field distribution in different mediums especially those used in aeronautics.

The finite element method is successfully applied since it adapts for any selected section. The numerical results enable to determinate the field values in any point of the chosen geometry and to determine thereafter the system parameters as well as the distribution of energy. Geometry dimensions, material properties and used frequency influence on results. And for the special cases these results are compared with those given by FEMLAB code. The results are very similar with a good precision which enables usage of the developed code to carry out simulations for other geometries of materials with different proprieties.

Keywords: Electromagnetic interaction, Maxwell's equations, aeronautical materials, Finite Element Method, field distributions, FEMLAB