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OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
UNIVERSITY CENTER OF TIPAZA MORSLI ABDELLAH



1st International Seminar on Mechatronics Innovation Materials, Renewable Energy, and Artificial Intelligence
(ISMIMREAI'24), November 16-17, 2024, Tipaza, Algeria

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Dr. Samah Boudour

Has Presented a Poster Communication , Entitled :

Shape Optimization of Digital model Using Matlab Tool



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Shape Optimization of Digital model Using Matlab Tool

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ABSTRACT

In additive manufacturing in contrast to subtractive manufacturing the production of simple or complicated components requires simple tools, novel processes and control engineering. Before starting all these technologies, it is necessary to provide a starting digital model for direct implementing a production by adding material process. The generation of digital models of components requires various modelling and simulation processes including the structural optimization, which includes the size, shape and topology hierarchy. Making a component stiff for given loading requires more material, which increases the weight of this component. Confronting this conflict, the present research work conducts and discusses a simulation study using Matlab tool for doing structural optimization of a surface inspired from a real product in order to perform the optimum between the weight and material amount. The written code has only applied to 2D case of the free-ends targeted surface without loads. This target surface is a round geometry with perforated interior derived from a physical phenomenon consisting of a round key holder. As expected, the ability to diminish the permissible surface area to 13~15% in a predefined (100%) space domain allows for reducing the material amount used and thus the weight of the target may be starkly reduce.

Keywords: *Structural optimization; topology; design domain; moment computing; simulation; Matlab*



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Aims and Scope

"The 1st International Seminar on Mechatronics, Innovative Materials, Renewable Energy, and Artificial Intelligence (ISMIMREAI'24) will be held at the Tipaza University Center – Morsli Abdallah on November, 13-14, 2024. Its objective is to bring together Algerian and non-Algerian researchers, teachers, and industrialists concerned with technological and scientific advances in materials science and Artificial Intelligence. This 1st international edition aims to be open to industrial concerns and the transfer of technologies between universities and industries. Therefore, themes of an applied nature are programmed to better meet the needs of the industrial community." The Scientific importance of this manifestation is to:

- Facilitate dialogue and collaboration between institute teachers and specialists across diverse materials and industries.
- Guarantee the sustainability of ISMIMREAI'24 and its expansion to other national universities, with active participation from the Tipaza University Center in various ISMIMREAI'24 committees, notably the ISMIMREAI Permanent Committee.
- Explore and discuss new avenues and initiatives aimed at constructing, advancing, and disseminating knowledge

Topics of interest include:

Topic 1: Mechatronics:

- Industrial electromechanical and electrical systems.
- Advanced applications of mechatronics.

Topic 2: Renewable Energies and Environment:

- Solar thermal energy.
- Thermal and mass transfer processes.
- Fluid mechanics, multiphase flow, and porous media.
- Photovoltaic/thermal hybrid systems.
- Bioenergy systems.
- Wind, geothermal, and hydraulic energy.
- Energy management and optimization.
- Presentation of the successful countries in the field of investment in renewable energies.

Topic 3: Innovative Materials

- Behavior of materials under various conditions.
- Characterization techniques for materials.
- Materials Sciences: polymer engineering, organic chemistry, biocomposite materials.
- Nanomaterials and nanotechnology applications.
- Degradation mechanisms.
- Innovative construction materials.

Topic 4: Artificial Intelligence

- Artificial intelligence algorithms applied in control engineering and robotics.
- Applications of AI in electric vehicles.
- Fault diagnosis and fault-tolerant control using AI techniques.
- Advanced applications of AI in multiphase machines.

Submission

Prospective authors are invited to submit their abstracts written in English: The abstracts in pdf format ((Abstract template: (<https://top4top.io/downloadf-3123rxe0u1-docx.html>) (accompanied by the registration form: <https://top4top.io/downloadf-3123ut8ur1-docx.html>)) should be submitted to the following emails:

Topic 1: topic1.ismimreai.2024@gmail.com

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