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REVIEWER'S REPORT

Manuscript No.: IJAR-50538 Date: February 6, 2025

Title: **Shape and Topological Optimization of a Nonlinear Elliptical Problem**

Recommendation:
Accept after minor revision

Rating	Excel.	Good	Fair	Poor
Originality		√		
Techn. Quality		√		
Clarity		√		
Significance		√		

Reviewer Name: Tegegne Getachew **Date:** February 6, 2025

Reviewer's Comment for Publication.

(*To be published with the manuscript in the journal*)

The reviewer is requested to provide a brief comment (3-4 lines) highlighting the significance, strengths, or key insights of the manuscript. This comment will be Displayed in the journal publication alongside with the reviewer's name.

Existence and derivation results are the main topics of the work, which addresses the challenges that arise from shape optimization problems. It draws spotlight on a common problem that arises when original data is the only source of solutions. The authors use the ε-cone property to guarantee the existence of solutions and incorporate geometric order limits, particularly volume-type constraints, to lessen this. Additionally, the Lagrange method is used to deduce the shape derivative, and a minmax strategy is used to create the topological derivative.

Detailed Reviewer's Report

Many fields, including engineering, physics, and materials science, find tremendous value in studying shape and topological optimization. The study is made more thorough by the emphasis on nonlinear elliptical problems. Using the ε-cone property and geometric order limits to deal with the non-existence of solutions is a novel strategy that may offer insightful information for further shape optimization research. A robust methodological basis is shown by the application of well-established mathematical techniques, such as the minimax approach for topological derivatives and the Lagrange method for form derivatives, and the abstract makes it simple for readers to comprehend the focus and importance of the work by outlining the primary goals of the study.

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line 38 the statement "The main in this paper…" is not meaning full.
line 49 write "…**ε-cone**…" instead of "**-cone**"
line "…. optimal form Section 3…" should be "optimal form. Section 3"

On page 5 *line* 132 the equation is not in a formal way.
From Lemma 4.1 "We
have the following assertions" should be written "We have the following assertions". Please see section 4.1 for similar typos.

In general, the paper is good, with minor typo correction, I recommend the paper for publication in International Journal of Advanced Research (IJAR).