

CONTACT MECHANISM DESIGN IN TOPOLOGY OPTIMIZATION USING THE THIRD MEDIUM CONTACT METHOD

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Abstract

Topology optimization involving contact interactions has long been recognized as a challenging problem due to its inherent nonlinearity and the difficulty of handling changing contact boundaries. Recently, the third medium contact (TMC) method has been proposed as an effective approach to simplify the treatment of contact conditions within a fixed design domain framework. The TMC method is particularly compatible with topology optimization formulations, enabling a unified representation of material distribution and contact interfaces. This feature makes it a promising tool for addressing a wide range of contact-related design problems. In this study, we focus on the design of contact-driven mechanical mechanisms and extend the TMC framework to topology optimization problems involving contact interactions. Numerical examples demonstrate the effectiveness and versatility of the method in generating innovative mechanism designs with embedded contact functionalities.