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Topology Optimization of 2D Continuum Structures with Buckling Constraints

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This paper presents a study on the topology optimization of 2D continuum structures considering linear buckling constraint. An optimization model for minimization of structural compliance under static loading subject to constraints on volume and buckling load factor is used, and the SIMP material model is employed. New strategies for eliminating the effect of artificial buckling modes on the solution process are proposed and investigated. It is found that there may exist a number of local solutions to the optimization problem and different schemes are presented to get better designs. Finally, numerical examples are presented to illustrate the effectiveness of the new approach proposed for the topology optimization with buckling constraints.