عنوان مقاله:

On the Six Node Hexagon Elements for Continuum Topology Optimization of Plates Carrying in Plane Loading and Shell Structures Carrying out of Plane Loading

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خلاصه مقاله:

The need of polygonal elements to represent the domain is gaining interest among structural engineers. The objective is to perform static analysis and topology optimization of a given continuum domain using the rational fraction type shape functions of six node hexagonal elements. In this paper, the main focus is to perform the topology optimization of two-dimensional plate structures using Evolutionary Swarm Intelligence Firefly Algorithms (ESIFA) and three-dimensional shell structures using optimality criteria. The optimization of plates carrying in plane loading is performed with minimum weight as objective. Two different types of shell structures are optimized using maximum strain energy as criteria. The optimal distribution of the material in the design domain obtained using six node hexagon elements is compared with the optimal distribution of material obtained using quadrilateral elements. A few problems from the literature have been solved and this study has proved that hexagon element gives better results over traditional quadrilateral elements.

کلمات کلیدی:

Six node hexagon, Topology, Shells, Firelfy algorithms, Strain energy optimization, Weight optimization

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