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Modeling and optimization of the composite plates laminated by genetic algorithm

Safer /M, Belkheir /F

Abstract : Our study made it possible to develop and test a program of optimization based on a technique of optimization based on the use of a genetic algorithm. This program moreover was applied to the resolution of several types of problems connected to the optimal design of laminated structures. Among these problems, orientations of the folds, the material and the number of folds as a variable which were already solved. In this work, we have presented the principles of the genetic algorithm functioning, its application to the laminated composites and to the original technique of coding which allows giving an account of the industrial constraints of composites development. The flexibility of the general structure of our software allows treating the various types of problems like: calculation of the module of rigidity as well as the factors of buckling and rupture. We develop the OpStrAG software to optimize the characteristics of rigidity of the laminates and also their constraints towards rupture and their deformations under a given loading.

Keywords : composite materials, laminated Plates, Modeling and optimization, genetic Algorithm.