Université de Pau et des Pays de l'Adour

An Interval Branch and Bound Method Dedicated to the Optimal Design of Piezoelectric Actuators

Frédéric Messine, Valérie Monturet, Bertrand Nogarède

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Résumé

The purpose of this article is to show the advantage of a deterministic global optimization method in the optimal design of electromechanical actuators. The numerical methods classically used are found either on Non-linear Programming techniques (Augmented Lagrangian, Sequential Quadratic Programming, ...) or on stochastic approaches which are more satisfactorily adapted to global optimum research (Genetic Algorithm, Simulated Annealing, ...). However, these kinds of methods only guarantee to reach the global optimum with some probabilities. The present paper proposes a deterministic interval Branch and Bound algorithm adapted to the dimensioning of a heterogeneous bimorph bar, working in bending quasi-static mode. This problem is formulated as a optimization problem with constraints and mixed variables : real and categorical types. Original solutions are given and discussed at the end of the paper.

Keywords : - Interval Analysis, Deterministic Global Optimization, Branch and Bound algorithms, Design of Piezoelectric Actuators, Mixed Problem, Categorical Variables.]

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Université de Pau et des Pays de l'Adour, UFR Sciences et Techniques, B.P. 1155 - 64013 PAU Cédex

Tél. (+33) 05 59 92 31 54 Fax : (+33) 05 59 80 83 74 http ://www.univ-pau.fr/~messine/R2I.html

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