

Coupled electromechanical optimization of power transmission lines

A. Carnicero López; E. Pilo de la Fuente; J.R. Jiménez Octavio; O. López García

Abstract-

This paper presents a multidisciplinary design and optimization method of power transmission lines. This optimization method solves both mechanical and electrical problems by a new strongly coupled method that also optimizes the potential designs using a genetic algorithm. A multi-objective function is formulated to simplify a constrained typical optimization problem into an unconstrained one. The scope of this work is the sizing and configuration optimization problem with fixed topology. The method is applied to a railway overhead transmission line. The genetic algorithm is applied to mechanical, electrical and electromechanical optimization problems obtaining good results. Finally, the solution of the electromechanical optimization problem is a trade-off between the multidisciplinary nature of the problem and the sort of optimization, sizing and configuration.

Index Terms- Multidisciplinary optimization, multi-objective analysis, structural design, electrical design, genetic algorithm

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