# Topological optimisation of vibration levels under periodic load with Moving Morphable Components (MMC)

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## ABSTRACT

In the design of aircraft engines, the vibration analysis is of major importance. To limit their levels, dry friction dampers are widely used to damp the vibrational response through the friction between contact surfaces. An accurate description of the contact interface as well as numerical methods able to predict accurately the nonlinear dynamic response of the system are mandatory [1]. In the meantime, lighter and more efficient structures are required by industrials. For this purpose, topological optimisation is used to identify new shapes of components to improve their efficiency but also to have less weight. Thus, the Moving Morphable Components (MMC) methodology is used to describe explicitly the geometry of the component [2,3]. This method gives a relatively low number of variables to optimize compare to usual topological optimization methods. The methodology gave good results for the optimization of eigenfrequencies [4]. The goal of this work is to apply the MMC method for the minimization of vibration levels in the case of a periodic load. Results show the good capacity of the method to deal with this kind of issues and might be applied in future for the design of industrial components.

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