BRUNEL MAFELAP 2016
The Mathematics of Finite Elements and Applications
Brunel University London, UK
14 – 17 June, 2016

Designing the Future: Lightweight Optimisation

Introduction

4D printing combines the potential of 3D printing with shape memory materials to create parts that morph exposed to a stimuli. In the case of polymeric materials, the printed part will have 2 states/shapes:

- The programmed shape (state 1)
- The printed/original shape (state 2)

The designing process must take into account both states/shapes of the part.

Methodology

The methodology proposed combines commercial CAD-FEM software with a developed parametric optimisation strategy based on Genetic Algorithms (GAs) and Kriging metamodel. The strategy can be summarised as follows:

Design of experiments (DOEs)