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# Optimal Reconfiguration of Spacecraft Formations Using a Variational Numerical Method

L. García [1] and J.J. Masdemont [2*]

[1] *Departament d'Informàtica i Matemàtica Aplicada, Universitat de Girona, Girona, Spain,*
[2] *IEEC & Departament de Matemàtica Aplicada I, Universitat Politècnica de Catalunya, Diagonal 647, 08028 Barcelona, Spain*

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**Abstract:** One of the key issues when working with formations of spacecraft is how to reconfigure the formation in order to change its orientation, its pointing or just to arrive to a given pattern. In this paper we treat these reconfiguration tasks as an optimal problem and set out the problem using the finite element method. Although the methodology is general, and suits to many different types of problems, the examples that have been considered focus in some basic maneuvers of the TPF and Darwin missions about the $L_2$ Lagrange point of the Earth-Sun system.

**Keywords:** *Formation flight; optimal reconfiguration; finite element method; spacecraft formations.*

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