

ASTRODYNAMICS SYMPOSIUM (C1)  
Mission Design, Operations & Optimization (1) (6)Author: Prof. Jean-Baptiste Caillau  
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FranceAPPROXIMATION BY FILTERING IN OPTIMAL CONTROL AND APPLICATIONS TO LOW  
THRUST ORBIT TRANSFER**Abstract**

Minimum time control of slow-fast dynamical systems is considered. In the case of only one fast angle, averaging techniques are available for such dynamical systems. The approach introduced in Gefroy et al (1997), Dargent (2014) and Bombrun et al. (2013) is recalled and extended to time dependent systems by means of a suitable filtering operator. The process relies upon approximating the dynamics by means of sliding windows. The size of these windows is an additional parameter that provides intermediate approximations between standard averaging over the whole fast angle period and the original dynamics. The method is illustrated on problems coming from low thrust orbit transfer. Numerical simulations based on an implementation of filtering into the industrial code T3D are presented. It shows the interest of this approach to perform continuation procedure by modifying the size of the filtering window starting from the solution of a minimum time orbit transfer using average dynamic and go to the solution with the original dynamics