國立中山大學應用數學系
學術演講

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講　題：A Full-Space Quasi Lagrange-Newton-Krylov Algorithm for Trajectory Optimization Problems in Space Missions

時　間：2016/12/01（星期四）15:30 ~ 16:30

地　點：理學院四樓理 SC 4009-1 室

茶　會：15:00 於理 SC 4010 室 (系辦公室)

摘 要

The objectives of this work are to develop and study the full-space quasi Lagrange-Newton-Krylov (FQLNK) algorithm for solving trajectory optimization problems arising from aerospace industrial applications. As its name suggests, we first convert the constrained optimization problem into an unconstrained one by introducing the augmented Lagrangian parameters. The next step is to find the optimal candidate solution by solving the Karush-Kuhn-Tucker (KKT) condition with the Newton-Krylov method. To reduce the computational cost of constructing the KKT system and meanwhile maintain Newton's fast convergence we employ the Broyden- Fletcher-Goldfarb-Shanno (BFGS) formula to build an approximation of the (1,1) subblock of the KKT matrix, which is the most expensive part of the overall computation. The BFGS-based FQLNK algorithm exhibits a superior speedup compared to some of the alternatives. We demonstrate our FQLNK algorithm to be a practical approach for designing an optimal trajectory of the launch vehicle in the space missions.

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