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THE TRAVELLING SPACE SALESMAN PROBLEM

Abstract

Mitigation of orbital debris begins with a sound understanding of relative motion in space. The relative motion of spacecraft in close-proximity is described by the Hill-Clohessy-Wilshire (HCW) equations. Accurately predicting target debris rendezvous trajectories can be quite complex and challenging. The research presented primarily focuses on the close-proximity operations of a proposed spacecraft intended for debris capture. The main objective of this research is to determine the most optimal (minimum ΔV) or fuel-economical trajectory, required for orbital debris mitigation, for such spacecraft present in close-proximity of 5 debris pieces in an orbit. The problem in essence is a traveling salesman problem but in space.