Abstract

Cold gas propulsion system technology is relatively less expensive than other propulsion systems. In this paper, for five usual gas as propellant and eight genera as structural used in this systems, first Isp (specific impulse) was checked and then, using three optimization methods, i. e. genetic algorithms, simulated annealing and particle swarm, the optimal total mass of system, principles of structure design, optimal chamber pressure and radius propellant tank were calculated as a multidisciplinary for each gas and structure. Using the results, it is possible to determine the gas, the suitable structure and configuration of the design; for this example, the results of the three algorithms were compared. Assuming that the amount of Thrust, working time and the size of thruster cylindrical chamber is given, it is evident that the gas which have the most Isp is not necessarily a good criterion to be used in the design stage of
Designing Space Cold Gas Propulsion System using Three Methods: Genetic Algorithms, Simulated Annealing and Particle Swarm

the cold gas system, and other criteria such as the total mass of the propulsion system, chamber pressure, the radius of the tank and the size of the structures must also be considered.

References


Index Terms

Computer Science Algorithms

Keywords

Propulsion System Multidisciplinary Optimized Design Cold Gas Genetic Algorithms Particle Swarm
Simulated Annealing.