

Optimization of Recirculation Line of Aircraft Fuel Thermal Management System Based on Minimizing Entropy Generation using Genetic Algorithm

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Abstract:

In aerospace engineering, the efficiency optimization of the aircraft fuel thermal management system (AFTMS) efficiency is critical for reducing operational costs and enhancing aircraft thermal performance. This paper presents an innovative approach to optimizing the recirculation line of AFTMS by applying the entropy generation minimization (EGM) method combined with a genetic algorithm (GA). The primary objective is to enhance system efficiency by reducing thermal irreversibility and optimizing cooling fluid dynamics within the system. The paramount importance of this study is to integrate EGM with GA. Therefore, it becomes a power tool that successfully and systematically identifies and implements optimal design parameters that minimize energy losses while improving the overall aircraft performance and sustainability.