

SPACE PROPULSION SYMPOSIUM (C4)
Hypersonic and Combined Cycle Propulsion (5)

Author: Mr. Siwei Dong

College of Aerospace and Materials Engineering, National University of Defense Technology, China,
dongsiwei@nudt.edu.cn

Prof. Weihua Zhang

National University of Defense Technology, China, zwh_kjs@163.com

Prof. Zhongwei Wang

College of Aerospace and Materials Engineering, National University of Defense Technology, China,
wzwnudt@126.com

THE ROLE OF EXERGY ANALYSIS IN SCRAMJET ENGINE PERFORMANCE ANALYSIS AND
OPTIMIZATION

Abstract

As a key component of hypersonic aircraft, scramjet engine has drawn people's attention worldwide for its attractive performance. The integration of scramjet with aircraft airframe has always been a bottleneck of hypersonic aircraft design although notably achievement has been obtained. Therefore, there is a need to develop a more general methodology that allows the complete vehicle design as a system that contains scramjet engine in the same basis. Exergy analysis has already been successfully applied to optimization of complex thermal systems and chemical processes in other industrial fields. This paper shows a revision of several papers related to the exergy method on the performance analysis of scramjet engine, and includes the different approaches and applications of design optimization. Also, a case study is included to illustrate the potential of the exergy tool.