

## Minimax Fractional Programming Involving Type I and Related Functions

S. K. Mishra<sup>1,\*</sup>, S. Y. Wang<sup>2</sup>, K. K. Lai<sup>3</sup> and Kalpana Shukla<sup>1</sup>

<sup>1</sup>Department of Mathematics Faculty of Science Banaras Hindu University, Varanasi-221005, India

<sup>2</sup>Institute of Systems Sciences Academy of Mathematics and Systems Sciences Chinese Academy of Sciences, Beijing, China

<sup>3</sup>Department of Management Sciences City University of Hong Kong 83- Tat Chee Avenue, Kowloon, Hong Kong

*Received May 11<sup>th</sup> 2009; Accepted November 23<sup>th</sup> 2009*

---

**Abstract**—The convexity assumptions for a minimax fractional programming problem of variational type are relaxed to those of a type I and related functions. Sufficient optimality conditions are established under the aforesaid assumptions. Several duality theorems are obtained for Wolfe type and Mond-Weir type duals and the original problem.

**Keyword**—Minimax programming; Fractional programming; Sufficient optimality conditions; Duality; Generalized convexity

---

---

\* Corresponding author's e-mail: [bhu.skmishra@gmail.com](mailto:bhu.skmishra@gmail.com)