

# MULTIOBJECTIVE OPTIMIZATION APPLICATION IN DOE PROBLEMS WITH MULTIPLE RESPONSES

*Douglas Miranda Rodrigues<sup>1</sup>, Aneirson Francisco da Silva<sup>2</sup>, Fernando Augusto Silva Marins<sup>3</sup>, Rafael de Carvalho Miranda<sup>4</sup>, Érica Ximenes Dias<sup>5</sup>, José Roberto Dale Luche<sup>6</sup>*

<sup>1</sup>National Institute for Space Research – INPE, Cachoeira Paulista, Brazil, douglas.rodrigues@inpe.br

<sup>2</sup>State University of São Paulo – UNESP, Guaratinguetá, Brazil, aneirson@gmail.com

<sup>3</sup>State University of São Paulo – UNESP, Guaratinguetá, Brazil, fmarins@feg.unesp.br

<sup>4</sup>Federal University of Itajubá – UNIFEI, Itajubá, Brazil, mirandaprod@yahoo.com.br

<sup>5</sup>State University of São Paulo – UNESP, Guaratinguetá, Brazil, ericaximenes@yahoo.com.br

<sup>6</sup>State University of São Paulo – UNESP, Guaratinguetá, Brazil, dluche@gmail.com

**Abstract:** In many areas, from Engineering to Economics, problems present themselves as multiobjective, which makes a decision-making process complex. Generally, these are conflicting objectives, and optimization techniques are necessary to achieve better results. This paper applies agglutination methods in classical problems of design of experiments with multiple responses. A theoretical review was made, and a new method was developed, using Compromise Programming and Goal Programming, with results comparison and analysis. The new proposal presented better results when compared to the traditional approach, qualifying this procedure as an alternative in multiple responses optimization.

**Keywords:** Epidemiology and Mathematical Models, Modeling, Numerical Simulation and Optimization, Nonlinear Systems and Neural Dynamics, Goal Programming, Compromise Programming.