

Comparing the Kronecker Models with Other Alternatives

Javier Cruz Salgado

Professor and Research
Universidad de las Américas Puebla
Puebla, México
javier.cruz@udlap.mx

Roxana Zaricell Bautista López

Universidad Politécnica del Bicentenario
PICIT, CIATEC
Silao, Guanajuato, México
rzaricell.picyt@ciatec.mx

Abstract

In this article we compared the Kronecker model against the Intercept model for a mixture experiment. We investigated conditioning using the variance inflation factor, the maximum and minimum eigenvalues of the information matrix, and the conditional number, to assess conditioning. The pseudocomponents transformation are also discussed. Practical examples are provided to support the conclusions. Recommendations regarding when to use the Kronecker and Intercept modeling approaches are provided. Conditioning was assessed in both adjusted models using the variance inflation factor and condition number. Evidence was given that, for the Intercept model, the choice of which component is replaced for the constant term is crucial in the sense on numerical stability.

Keywords

Kronecker model, Intercept model, mixture constraints, Pseudocomponents transformation.

Javier Cruz Salgado is a Doctor of Science and Technology in Industrial and Manufacturing Engineering. Master in Science and Technology with a specialty in Industrial and Manufacturing Engineering from the Center for Industrial Engineering and Development and the Center for Applied Innovation in Competitive Technologies A.C. (CIATEC). Likewise, he has postdoctoral studies in Optical Metrology at the CIO.

Roxana Zaricell Bautista López Electronic Engineer, graduated from the Instituto Tecnológico de Tuxtla Gutiérrez in 2009. She completed a master's degree in Optomechatronics at the Centro de Investigaciones en Óptica, A. C. in Leon Guanajuato in the period from 2011 to 2013 with the thesis topic of "Medición de la topografía de objetos especulares por la técnica de reflexión de luz estructurada".