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Estimation of Regression Lines through the Focal Point and Related Theories

Nagatomo NAKAMURA[1,*] **and Takahiro TSUCHIYA**[2,*]

[1] Sapporo Gakuin University
[2] Josai University

Abstract

This paper discusses two kinds of regression models, namely the model of regression lines through the focal point (RLF) and the model of regression line through the origin (RLO). The focal point will change according to the conditions of the experiments or the measurement site, so it will be estimated together with regression coefficients. Considering the experimental conditions, four models are proposed and the best model among them is selected by AIC. The models are verified by numerical experiments, and are applied to the wind-blown sand data.

Especially, as RLO has the unique characteristics of not necessarily crossing a centroid, it is different to the ordinal regression line. For this reason, some related theories and relationship with RLF and RLO are discussed.

Key words: AIC, adjusted coefficient of determination, coefficient of determination, family of regression line through a fixed point, focal point, focal point regression model, regression line through the origin, wind-blown sand data.

*Corresponding author

E-mail addresses: nagatomo@sgu.ac.jp (Nagatomo NAKAMURA)
takahiro@math.josai.ac.jp (Takahiro TSUCHIYA)

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