



Regression analysis of a ternary alloys system

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Abstract

In the mechanical and electrical properties of alloys research process an important role is three-component systems. Regression analysis allows that on the basis of experimental results define mathematical models depending on the size of the mole fraction of the individual components of the mixture. This paper presents an algorithm for the selection, evaluation and diagnosis of optimal mathematical model for the three-component system which contains following stages:

- Input of experimental data
- The summary statistics of possible mathematical models
- Choice of stochastic models
- ANOVA analysis - assessment of the significance of the model
- Checking the adequacy of the mathematical model
- The interval estimate of model parameters
- Diagnostic models and, if necessary, the transformation model
- Interval estimation of regression function
- Graphic interpretation and interpretation of the model.

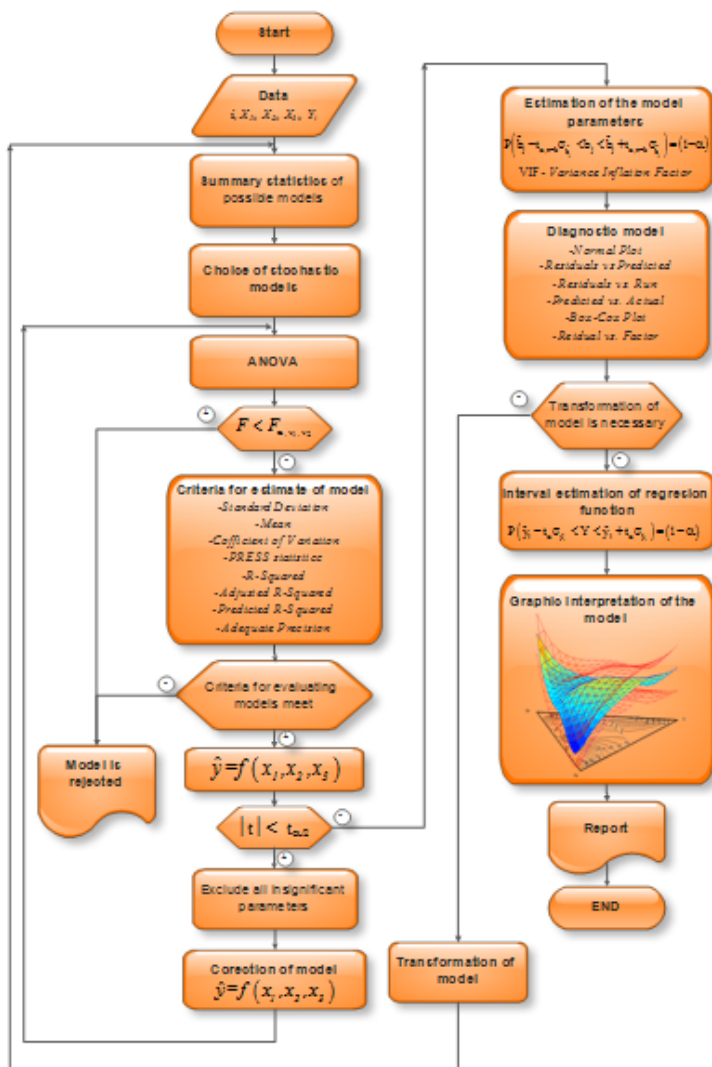
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References

1. Scheffé H., *Experiments With Mixtures*, Journal of the Royal Statistical Society. Series B (Methodological), 1958, Vol. 20, № 2, p. 344–360.
2. Scheffé H., *The Simplex-Centroid Design for Experiments With Mixtures*, Journal of the Royal Statistical Society. Series B (Methodological), 1963, Vol. 25, № 2, p. 235–263.
3. Cornell J.A., *Experiments With Mixtures: Designs, Models, and the Analysis of Mixture Data*, 3rd ed., John Wiley & Sons, Inc., New York, 2002.
4. Cornell J.A., *A primer on Experiments with Mixtures*, John Wiley & Sons, Inc., New Jersey, 2011.

Graphical abstract:



An algorithm for the selection of optimal stochastic model of a ternary alloy system