

相似准则方程的正确建立及其与回归正交旋转设计的比较

Proper Formulation of π -Equation and a Comparison With Regressive Orthogonal Rotating Experimental Design

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中文关键词: 相似准则; 组分方程; π 关系式; 回归正交旋转设计

英文关键词: Dimensionless product Component equation π -equation Regressive orthogonal rotating experimental design

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中文摘要:

该论文找出相似准则和相应的实验求出组分方程和组合成 π 关系式的预测误差较大的原因及其修正对策。指出Murphy的 π 函数合成理论中“组分方程必须具有相同型式”的约束和回归方程相关系数过低是误差产生的主要原因。在与回归正交旋转试验设计的对比中指出了 π 试验设计的一些特点,其中回归试验结果时方程的模式几乎不受限制,这一特点是保证预测精度的首要条件,在此基础上提出了分区组合 π 方程和分区预测的新方法。

英文摘要:

It is more often than not that prediction precision of an empirical equation is low, which is obtained through the π -equation, the component equations and the corresponding experiments. This paper revealed that “The component equations must have the same form”, advanced by G. Murphy and the lower correlation coefficient of regression model are the major sources of the prediction error. Based on the experiment of “Settling Time of a Sphere in a Fluid” containing 7 variables, author explicitly suggested that the component equations may have different forms from each other and advanced that the prediction may be carried out in a set of separated areas on the curved surface in the factorial space. Each area has its own π -equation which is formulated by corresponding component equations. A comparison with the regressive orthogonal rotating experimental design was briefly made.

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