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Plackett and Burman arrays Revisited

Plackett-Burman designs are experimental designs presented in 1946 by Robin L. Plackett and J. P. Burman while working in the British Ministry of Supply. Their goal was to find experimental designs for investigating the dependence of some measured quantity on a number of independent variables (factors), each taking L levels, in such a way as to minimize the variance of the estimates of these dependencies using a limited number of experiments. Interactions between the factors were considered negligible.

To this day I believe many experimenters overlook the use of these designs as they don't require a large amount of complex analysis.

During my time teaching Design of Experiment (DoE) I have focussed on the use of the Plackett and Burman (PB) 8 run experiment with the possibility to change 7 factors with 2 levels each. I have also started to study using 2 PB 8 run arrays with the same factors to generate data for an inner array and an outer array. I wish to describe the approach and demonstrate the benefits. I will also detail how domain knowledge and Statistical Process Control can further enhance learning.

I will use the helicopter experiment commonly used to test DoE as an example to demonstrate how domain knowledge, SPC and Plackett and Burman designs can be used in a practical and easy to follow manner.

This talk will focus on practical applications and delivering business solutions with minimal cost. I have found no other reference to my approach.

Special/ Invited session

Classification

Keywords

Primary author: Dr SMYTH-RENSHAW, Jonathan (Jonathan Smyth-Renshaw & Associates Ltd)

Presenter: Dr SMYTH-RENSHAW, Jonathan (Jonathan Smyth-Renshaw & Associates Ltd)

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