

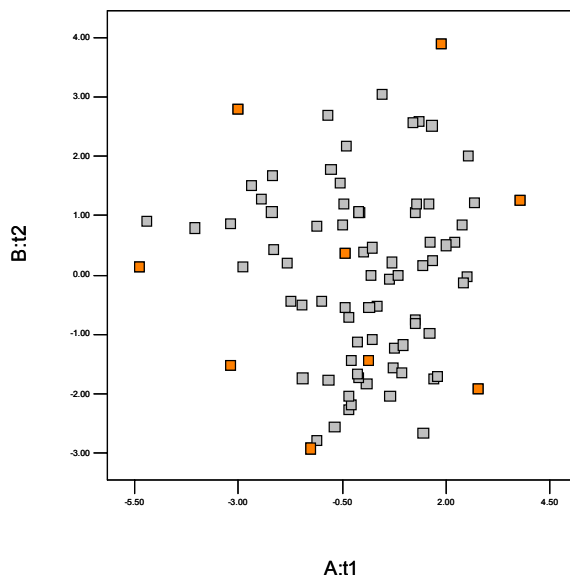
## Workshop:

# Multivariate Data Analysis in a DOE-context

Multivariate methods such as Principal Component Analysis (PCA) have been developed to deal with correlations between variables. In this workshop a brief introduction to Principal Component Analysis will be given, with two illustrations of its use and power in a DOE context.

### Principal Properties Design

You may need to test different solvents, additives, catalysts, system configurations, .... In that case you're dealing with so-called categorical variables. Since categorical variables with  $n$  levels can be considered as  $n-1$  variables, the number of experimental runs needed in a design increases rapidly with the number of levels to be tested, and often we can't test them all.



A typical example is the choice of solvents to be used. For this example a first step in Principal Properties Design is to describe the solvents by a set of quantitative properties that are related to what makes them different (e.g. polarity, mass, di-electric constant, ...), which results in a set of ten to twenty highly correlated variables.

The next step is then to perform a PCA and select a representative set of solvents based on the principal components that adequately describe the set of descriptors, i.e. the principal properties.

With Principal Properties Design the problem of multi-level categorical factors can be circumvented, and on top, we even get information about items / levels that have not been explicitly tested.

### Multi-response problems

Text-book examples of design often consider studies with just one or two responses. In real life you may have dozens. Again PCA can reveal the correlation between all those responses which helps identifying outlying values and prove unattainable targets (e.g. low value for response Y1 combined with high values for Y2 when they exhibit strong positive correlation).

### Practical

This workshop will be held:

- On June 3, 2010 (Lucern, Switzerland) as post-conference workshop of the 3<sup>rd</sup> European DOE user meeting of June 1 and 2 ([www.statease.com/europeanusermeeting.html](http://www.statease.com/europeanusermeeting.html))
- In the Autumn of 2010 in Belgium (date and location will be set later)

