Could CODA Methodology be Useful in Control Chart Techniques?

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On standard control charts, the hypothesis of normality is usually assumed without any additional verification. Nevertheless, in some cases this assumption is not accurate and might cause errors in process quality monitoring. In particular, for the control of the proportion of nonconforming units (p-chart) the normality is doubtful when p is small and consequently, lower control limit less than or equal to zero are frequent. Some authors have proposed new techniques to define limits in the p-chart. Others have proposed transformations to improve the detection of special causes.

In X-bar charts, the mean of a critical to quality (CTQ) characteristic is monitored. When the variable is far from normality, then parametric, or even nonparametric, control charts might be used. Recent works suggest applying transformations to make the data quasi-normal. This kind of lack of normality is usually present when in those analyses CTQ is a part of a composition.

Our proposal is to highlight how above mentioned problems can be treated from a compositional point of view. New strategies are proposed and illustrated trough a case study where a proportion has the role of a CTQ.