

## Sequential Bayesian Gage R and R Studies: A Graphical Approach

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### Abstract

The outcomes of a measurement study can be modeled with a random-effects model with two random components: one for parts, the other for measurement device. For a measurement procedure to be acceptable, the device-to-device variance and error variance should be small in comparison to the part-to-part variance. Using a Bayesian approach yields an easy sequential analysis to decide on the acceptability of the measurement procedure, but the decision rule for increments (add another part, measuring device, or measurement) is not obvious.

We examine the so-called correlations— the variance of one component over the sum of all three— to give some help. A posterior sample (generated using MCMC methods) of these quantities can be plotted on a 2-dimensional triangle. This graphical presentation leads to an easily explained increment rule. We describe this rule and explore its behavior through simulation studies.