# IMPLEMENTING TWO-STAGE TESTS

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A two-stage test can be viewed as a family of conditional error functions $\bar{\alpha}_{\alpha_2}(p_1)$, specifying the type I error conditional on the p-value $p_1$ of the first stage. The parameter $\alpha_2$ is the local level of the test after the second stage, that is, the overall level if the possibility of early stopping is ignored. The test is put into practice by specifying the overall level $\alpha$, stopping bounds $\alpha_1$ and $\alpha_0$, and the parameter $\alpha_2$, that is, one of the functions in the chosen family. After computing $p_1$, the test stops with or without rejection of the null hypothesis if $p_1 \leq \alpha_1$ or $p_1 > \alpha_0$, respectively. Otherwise, the null hypothesis is rejected if and only if $p_2 \leq \bar{\alpha}_{\alpha_2}(p_1)$.
The four parameters $\alpha$, $\alpha_0$, $\alpha_1$ and $\alpha_2$ are interdependent, and the form of their relationship depends on the test under consideration. Software has been implemented in *R* to calculate any of the four parameters based on the remaining ones, possibly under side conditions, for four different tests. Graphical visualization routines and the computation of overall p-values are also included. The software is free and can be downloaded from http://www.math.uni-magdeburg.de; examples demonstrate its practical use.