Question #28401 give me an exampe to perform levene's test. i have school project that make an app for QUEST algorithm. after do chi square or anova f test, sometimes i have to do levene's test. if you don't mind help me with an example

Solution. Levene's test is used to test if k samples have equal variances. Equal variances across samples is called homogeneity of variance. Suppose that your big sample $Y = (Y_{1,\cdot}, \ldots, Y_{k,cdot})$ is divided into k "small" samples $Y_{i,\cdot}, 1 \leq i \leq k$. Leven's test tests whether r.v.s inside small groups possess the same variance. Statistic of the test is

$$W = \frac{(N-k)\sum_{i=1}^{k} N_i (\overline{Z_{i,\cdot}} - \overline{Z_{\cdot,\cdot}})^2}{(k-1)\sum_{i=1}^{k}\sum_{j=1}^{N_i}(Z_{i,j} - \overline{Z_{i,\cdot}})^2}$$

here $Z_{i,j} = |Y_{i,j} - \overline{Y_{i,\cdot}}|$, $\overline{Y_{i,\cdot}}$ is the mean of the i-th group. Respectively, $\overline{Z_{i,\cdot}}$ are the group means of $Z_{i,j}$, $\overline{Y_{\cdot,\cdot}}$ is the mean of the all $Z_{i,j}$, N, N_i are respectively the size of the big and small samples. After calculating this statistics you should compare it with $F_{a,k-1,N-k}$ $1 - \alpha$ (take $\alpha = 0.05$ for instance) quantile of Fisher distribution with $k-1$ and $N-k$ degrees of freedom. If $W > F_{a,k-1,N-k}$, then the null hypothesis is rejected, that is the variance inside the small samples differs. Otherwise, we accept the null hypothesis.

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