

# Supplementary Documents for “New Score Tests for Equality of Variances in the Application of DNA Methylation Data Analysis”

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# Supplementary Documents

## A Levene's test

Levene's test statistic for two-sample case is defined as

$$W = \frac{(n-2) [n_1 (\bar{w}_1 - \bar{w})^2 + n_0 (\bar{w}_0 - \bar{w})^2]}{\sum_{i=1}^{n_1} (w_{1i} - \bar{w}_1)^2 + \sum_{j=1}^{n_0} (w_{0j} - \bar{w}_0)^2},$$

where  $n_0$  and  $n_1$  are the numbers of controls and cases, respectively,

$$w_{1i} = |x_{1i} - \bar{x}_1|, \bar{x}_1 = \frac{1}{n_1} \sum_{i=1}^{n_1} x_{1i},$$

$$w_{0j} = |x_{0j} - \bar{x}_0|, \bar{x}_0 = \frac{1}{n_0} \sum_{j=1}^{n_0} x_{0j},$$

$$\bar{w}_1 = \frac{1}{n_1} \sum_{i=1}^{n_1} w_{1i},$$

$$\bar{w}_0 = \frac{1}{n_0} \sum_{j=1}^{n_0} w_{0j},$$

$$\bar{w} = \frac{1}{n} \left[ \sum_{i=1}^{n_1} w_{1i} + \sum_{j=1}^{n_0} w_{0j} \right],$$

$x_{1i}$  is the measurement for the  $i$ -th case,  $x_{0j}$  is the measurement for the  $j$ -th control, and

$n = n_0 + n_1$ .

## B Brown and Forsythe test

Brown-Forsythe test statistic for two sample comparison has the same format as Levene's test. The only difference is in the definition of  $w_{1i}$  and  $w_{0j}$ :

$$w_{1i} = |x_{1i} - \tilde{x}_1|,$$
$$w_{0j} = |x_{0j} - \tilde{x}_0|,$$

where  $\tilde{x}_1$  and  $\tilde{x}_0$  are the medians for cases and controls, respectively.

## C Trimmed-mean-based Levene's test

Trimmed-mean-based Levene's test for two sample comparison has the same format as Levene's test. The only difference is in the definition of  $w_{1i}$  and  $w_{0j}$ :

$$w_{1i} = |x_{1i} - \check{x}_1|,$$
$$w_{0j} = |x_{0j} - \check{x}_0|,$$

where  $\check{x}_1$  and  $\check{x}_0$  are the 5% trimmed means for cases and controls, respectively. The 5% trimmed mean for a sample is the sample mean after trimmed 5% lowest values and 5% highest values.