$H_o : \sigma_1^2 = \sigma_2^2 \quad H_a : \sigma_1^2 \neq \sigma_2^2$

Fmax Test: (a.k.a. Hartley's test)

$F_{max,s} = \frac{s_{max}^2}{s_{min}^2}$ *df=n*-1* where *n* = max(n₁, n₂)*

Brown & Forsythe's Test: (for 2 samples)

- Absolute deviations from the median measure variability or variance: $|x_j - \tilde{x}|$
- Uses recoded data: $z_{1j} = |x_{1j} - \tilde{x}_1|$, $z_{2j} = |x_{2j} - \tilde{x}_2|$ where $\tilde{x}_i$ is the median of sample *i*.
- →H_o: *"deviations from the median are the same in the 2 populations"*

$T_{BF} = \frac{\bar{z}_1 - \bar{z}_2}{SE_{\bar{z}_1 - \bar{z}_2}}$ with $df = n_1 + n_2 - 2$ (Equal variance with s_p^2 in the *SE*)

with a two-sided Rejection Region

- Note:
  - More robust to non-normal populations than the Fmax test and F-test.
  - Levene's test used $z_{1j} = |x_{1j} - \bar{x}_1|$, $z_{2j} = |x_{2j} - \bar{x}_2|$, with $\bar{x}$ rather than $\tilde{x}$.
  - Brown & Forsythe's version is more robust, since it uses deviations from the median.

R:

- There is no Fmax test in R, but it is easy to compute and ballpark the critical values.
- *var.test()* in R uses the F-test which is not robust to non-normal data.

Example: [specially created so that $sd(Z_i)=mean(Z_i)$ for convenience]

x1	x2	z1	z2
3	2		
5	6		
6	14		
	mean		
	SD		