f '$_c$ evaluation from 1 or 2 series of tests according to ACI 318 95

Procedure is valid whenever the vectors hold 30 or more results of tests or pairs of tests

Columns := 2

Requirement := 1 requirement is

1 for 1/100 probability of 1 in 3 consecutive test be below fc
2 for 1/100 probability of any test more than 0.5 ksi below fc

$f_1 := ksi \cdot \begin{pmatrix} 3.5 \\ 3.3 \\ 3.2 \\ 3.1 \\ 3.5 \\ 3.4 \\ 3.4 \\ 3.66 \\ 3.7 \\ 3.4 \\ 3.2 \\ 3.5 \\ 3.45 \\ 3.4 \\ 3.2 \\ 3.6 \\ 3.6 \\ 3.77 \\ 3.2 \end{pmatrix}$

$f_2 := ksi \cdot \begin{pmatrix} 3 \\ 3.1 \\ 3.2 \\ 3.4 \\ 3.7 \\ 3 \\ 3.2 \\ 3.35 \\ 3 \\ 4 \\ 3.5 \\ 3 \\ 3.2 \\ 3.2 \\ 3.34 \\ 3.47 \\ 3.15 \\ 3.61 \\ 3.12 \end{pmatrix}$

$$f_1 := \begin{pmatrix} 3.2 \\ 3.4 \\ 3.5 \\ 3.33 \\ 3.7 \\ 3.2 \\ 3.33 \\ 3.61 \\ 3.12 \\ 3.4 \\ 3.44 \end{pmatrix} \qquad f_2 := \begin{pmatrix} 3.45 \\ 3.2 \\ 3.5 \\ 3.6 \\ 3.66 \\ 3.35 \\ 3.21 \\ 3.4 \\ 3.3 \\ 3.7 \\ 3.8 \end{pmatrix}$$

$S_1 := \mathrm{Stdev}(f_1)$ $\qquad$ $S_2 := \mathrm{Stdev}(f_2)$

$$S_1 := \sqrt{\frac{\sum_{i=1}^{\mathrm{length}(f_1)} \left(f_{1_i} - \mathrm{mean}(f_1)\right)^2}{\left(\mathrm{length}(f_1) - 1\right)}}$$

This is what accords to Stdev and so with S_2

$f := \mathrm{augment}(f_1, f_2)$

$$\mathrm{ave} := \begin{cases} \mathrm{mean}(f) & \text{if Columns} = 2 \\ \mathrm{mean}(f_1) & \text{otherwise} \end{cases}$$

$$s := \begin{cases} \sqrt{\left[\dfrac{\left(\mathrm{length}(f_1) - 1\right)\cdot {S_1}^2 + \left(\mathrm{length}(f_2) - 1\right)\cdot {S_2}^2}{\mathrm{length}(f_1) + \mathrm{length}(f_2) - 2}\right]} & \text{if Columns} = 2 \\ S_1 & \text{otherwise} \end{cases}$$

we suppress '

$$f_c := \begin{cases} ave - 1.34 \cdot s & \text{if Requirement} = 1 \\ ave + 0.5 \cdot ksi - 2.33 \cdot s & \text{otherwise} \end{cases}$$

$f_c = 3.08\,ksi$ $\quad ave = 3.38\,ksi$ $\quad s = 0.22\,ksi$

$f_c = 216.73\,\frac{kgf}{cm^2}$ $\quad ave = 237.9\,\frac{kgf}{cm^2}$ $\quad s = 15.79\,\frac{kgf}{cm^2}$