Example 2: Recall past example. The data were daily rates of returns of $n_A = 20$ randomly chosen days for a certain stock, which will call Stock A:

$1.8, +1.4, -3.4, +4.8, +3.3, -0.1, +2.9, -1.1, +3.1, -1.4, +2.1, -0.7, +0.8, -2.7, +0.6, -0.6, -1.8, +1.2, -0.5, -1.1$

A random sample of $n_B = 20$ daily rates of returns were taken on a different stock, Stock B. The data is given below:

$-1.3, +10.0, -2.0, -7.3, +2.8, +6.8, -0.3, +1.5, -4.7, +22.6, +1.1, +4.3, +3.5, +6.7, +5.0, +11.2, -5.5, -2.3, -0.4, 0.0$

Find a 95% confidence interval for the $\frac{\sigma_B}{\sigma_A}$. What can you infer from this interval?

take a look at R-code!

$\bar{A} = 0.43$ $\quad \bar{B} \cong 2.585$ $\quad \alpha = 0.05$

$S_A \cong 2.151$ $\quad S_B \cong 6.796$ $\quad 1-\alpha = 0.95$

make more?... but more risky? ⇒ wait this is sample data are the differences we are seeing due to anything more than randomness of selection?

$$P\left[\sqrt{\frac{S_B^2}{S_A^2\, F_{1-\frac{\alpha}{2},(n_B-1,n_A-1)}}} < \frac{\sigma_B}{\sigma_A} < \sqrt{\frac{S_B^2}{S_A^2\, F_{\frac{\alpha}{2},(n_B-1,n_A-1)}}}\right] = 1-\alpha.$$

Based on this sample we are 95% confident that... $1.988105 < \frac{\sigma_B}{\sigma_A} < 5.022850$

the point ⇒ $\sigma_B > \sigma_A$ Stock B is significantly more risky, variable...

try ratio $\frac{\sigma_A}{\sigma_B}$ ... ⇒ $0.1990902 < \frac{\sigma_A}{\sigma_B} < 0.5029915$

$\Rightarrow \sigma_A < \sigma_B$