

has approximately the same power for testing $\xi > 0$ (and $\xi < 0$) as the corresponding Student t -test based on

$$(5) \quad t = \frac{(\bar{r} - \xi) \sqrt{n(n-1)}}{\sqrt{\sum_1^n (r_i - \bar{r})^2}}$$

for $n \leq 10$.

Using the notation of section 4 let

$$r_u = \frac{\sqrt{s}}{K_1} \left[K_1 y_u - \sum_1^n y_i + K_2 \sqrt{\frac{r}{s}} x \right], \quad (u = 1, \dots, n),$$

where $\frac{K_1}{K_2} > 0$. Then from consideration of (4) with $C = 0$ it is seen that the r_u are independently distributed according to $N(\xi, \sigma^2)$, where ξ equals a positive constant times $(\nu - \mu)$. Following the derivations in section 4 with $C = 0$, it is seen that the test of $\xi > 0$ with this particular choice of the r_u is identical with the test of $\nu > \mu$ given in (B) of section 3. Similarly the test of $\xi < 0$ is identical with the test (B) of $\nu < \mu$. Thus the test (B) has approximately the same power for testing $\nu > \mu$ (and $\nu < \mu$) as the Student t -test based on the value of t given in (5) if $n \geq 10$. Replacing the r_u in (5) by their values in terms of x, y_1, \dots, y_n, n, r , and s , it is found that (5) becomes

$$t = \frac{[x - \bar{y} - (\nu - \mu)]}{\sqrt{\sum_1^n (y_i - \bar{y})^2}} \cdot \sqrt{\frac{n-1}{s \left(\frac{1}{r} + \frac{1}{ns} \right)}}$$

This proves that test (B) is approximately as powerful for testing $\nu > \mu$ and $\nu < \mu$ as the most powerful test based on the quantities x, y_1, \dots, y_n if $n \leq 10$. As test (A) is a particular case of test (B), these results also apply to test (A).

REFERENCES

[1] J. F. DALY, "On the use of the sample range in an analogue of Student's t -test". *Annals of Math. Stat.*, Vol. 17 (1946), pp. 71-74.
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ON THE NORM OF A MATRIX

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In studying the convergence of iterative procedures in matrix computation and in setting limits of error after a finite number of steps, Hotelling [1] used the square root of the sum of squares of the elements of a matrix as its norm. A wide class of functions exists which may be employed as norms in matrix calculation and substituted directly in the expressions derived by Hotelling. The