

The quantity $T^2 = [N_1 N_2 / (N_1 + N_2)] D^2$ where N_i is the size of the sample from class i , is called ‘Hotelling’s T^2 statistic’ and is useful for testing differences between the feature mean vectors for the two groups. To test the hypothesis $H_0: \mu_1 = \mu_2$ versus the alternative $H_1: \mu_1 \neq \mu_2$, we convert T^2 to Snedecor’s F [Burin70]⁴ by

$$F = \frac{N_1 + N_2 - d - 1}{d(N_1 + N_2 - 2)} \times \frac{N_1 N_2}{N_1 N_2} D^2 \quad (7.25)$$