A two sample test in high dimension with fewer observations

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In this paper, we propose a test for testing the equality of mean vectors of two groups with unequal covariance matrices based on N_1 and N_2 independently distributed p-dimensional observation vectors. This test is invariant under the transformation of the observation vectors by any $p \times p$ diagonal matrix. There are no tests available in the literature that has this invariance property.

The asymptotic distribution of the test statistics is given as $(N_1, N_2, p) \to \infty$, where $(N_1/N_2) \to k \in (0, \infty)$ but (N_1/p) and (N_2/p) may go to zero or infinity.