ON AN OPTIMUM TEST OF THE EQUALITY OF TWO COVARIANCE MATRICES

N. GIRI

Department of Mathematics and Statistics, University of Montreal, P.O. Box 6128, Station A, Montreal, Quebec, Canada H3C 3J7

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Abstract. Let $X : p \times 1$, $Y : p \times 1$ be independently and normally distributed p-vectors with unknown means ξ_1, ξ_2 and unknown covariance matrices Σ_1, Σ_2 (> 0) respectively. We shall show that Pillai's test, which is locally best invariant, is locally minimax for testing $H_0 : \Sigma_1 = \Sigma_2$ against the alternative $H_1 : \mathrm{tr}(\Sigma_2^{-1}\Sigma_1 - I) = \sigma > 0$ as $\sigma \to 0$. However this test is not of type D among G-invariant tests.

Key words and phrases: Locally best invariant tests, locally minimax tests, type D critical region.