

## ABSTRACT

A test is presented for testing equality of two multivariate means versus the alternative that the differences between the two means is ordered relative to the components. For this test methods for conducting two stage tests and interim analyses are also presented. The joint limiting distributions of the two stage test statistics and the interim analysis test statistics are obtained and investigated. In some cases these limiting distributions are bivariate normal, in other cases they are certain bivariate or trivariate chi square distributions. It is proposed that these limiting distributions can be used to approximate the exact distributions. These approximations can then be used to obtain critical values for these two problems. A bootstrap estimate is proposed to estimate the unknown variance in one of the tests and its consistency is also proved. A bootstrap estimate of the correlation coefficient between the two test statistics in an interim analysis is proposed. In order to investigate how good the approximations are, simulations were done.