Area based testing under likelihood ratio ordering

Christopher Carolan* and Joshua M. Tebbs

Department of Mathematics, East Carolina University

Department of Statistics, University of South Carolina

E-Mail: carolanc@mail.ecu.edu; tebbs@stat.sc.edu

Abstract: The ordinal dominance curve formed by the one sample and two sample MLE estimators of two cumulative distribution functions F and G under likelihood ratio ordering possesses a very appealing geometric interpretation in terms of the ordinal dominance curve formed by the traditional empirical estimates of F and G. This geometric interpretation, a least concave majorant, suggests some natural testing procedures. The Mann-Whitney test statistic is the area under the ordinal dominance curve formed by the traditional empirical estimates of F and G. Under a likelihood ratio ordering constraint, a natural test statistic is the area under the restricted or concave ordinal dominance curve. Tests are suggested for testing equality of F and G versus likelihood ratio ordering and likelihood ratio ordering versus all alternatives.