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Daniel Eugene Osborne* (daniel.osborne@famuc.edu), Department of Mathematics, 1617 S Martin Luther King Jr. Blvd, 314 Jackson-Davis Hall, Tallahassee, FL 32307. *Nonparametric Two-Sample Tests on Homogeneous Riemannian Manifolds, Cholesky Decompositions and Diffusion Tensor Image Analysis.*

This paper addresses much needed asymptotic and nonparametric bootstrap methodology for two-sample tests for means on Riemannian manifolds with a simply transitive group of isometries. In particular, we develop a two-sample procedure for testing the equality of the generalized Frobenius means of two independent populations on the space of symmetric positive matrices. The new method naturally leads to an analysis based on Cholesky decompositions of covariance matrices which helps to decrease computational time and does not increase dimensionality. The resulting nonparametric matrix valued statistics are used for testing if there is a difference on average at a specific voxel between corresponding signals in Diffusion Tensor Images (DTI) in young children with dyslexia when compared to their clinically normal peers, based on data that was previously analyzed using parametric methods. (Received February 10, 2014)