Thomas Hotz

Comparing extrinsic and intrinsic means on the circle

There exist two natural metrics on the circle, chordal distance and arc-length; the corresponding Fréchet means are called extrinsic and intrinsic means, respectively. We review their mathematical and statistical properties, in particular regarding their uniqeness, computation, stability, asymptotic relative efficiency, and the construction of universal, non-asymptotic confidence sets for them. When comparing the two concepts accordingly, neither outperforms the other in all aspects but the extrinsic mean appears better suited for most practical applications.