FENCHEL DUALITY AND A SEPARATION THEOREM ON HADAMARD MANIFOLDS

Maurício Silva Louzeiro[1]

[1] Dongguan University of Technology

In this talk, we introduce a definition of Fenchel conjugate and Fenchel biconjugate on Hadamard manifolds based on the tangent bundle. Our definition overcomes the inconvenience that the conjugate depends on the choice of a certain point on the manifold, as previous definitions required. On the other hand, this new definition still possesses properties known to hold in the Euclidean case. It even yields a broader interpretation of the Fenchel conjugate in the Euclidean case itself. Most prominently, our definition of the Fenchel conjugate provides a Fenchel-Moreau Theorem for geodesically convex, proper, lower semicontinuous functions. In addition, this framework allows us to develop a theory of separation of convex sets on Hadamard manifolds, and a strict separation theorem is obtained.