Damped Newton Method on Riemannian Manifolds

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A damped Newton's method to find a singularity of a vector field in Riemannian setting will be presented with global convergence study. It is ensured that the sequence generated by the proposed method reduces to a sequence generated by the Riemannian version of the classical Newton's method after a finite number of iterations, consequently its convergence rate is superlinear/quadratic. We can observe from numerical experiments that DNM presented promising results when compared with the well known BFGS and Trust Regions methods. Moreover, damped Newton's method presents better performance than Newton's method in number of iteration and computational time.