On the globalization of Riemannian Newton method

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In order to find a singularity of a vector field defined on Riemannian manifolds, we present a new globalization strategy of Newton method and establish its global convergence with superlinear rate. In particular, this globalization generalizes for a general retraction the existing damped Newton's method. Our global convergence analysis does not require any hypothesis on singularity of the vector field. We applied the proposed method to solve the truncated singular value problem on the product of two Stiefel manifolds, the dextrous hand grasping problem on the cone of symmetric positive definite matrices and the Rayleigh quotient on the sphere.Numerical experiments show that the proposed algorithm has better robustness compared with the aforementioned method.