

Title: Geometric Approaches to Interior-Point Methods

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Abstract:

There are two differential geometric approaches to interior-point algorithms; one based on the traditional Riemannian geometry and the other based on information geometry developed recently. We focus on difference of these two approaches in several aspects including the measure of distance of two points, geodesic curves etc, etc. We also show that a standard short-step interior-point algorithm can be naturally understood as a predictor-corrector algorithm in the framework of information geometry, though no explicit predictor step is taken. Based on this interpretation, we derive the integral by Nesterov and Todd which essentially expresses the number of iterations of the short-step algorithm formerly derived based on the Riemannian geometric framework.