

Information geometry associated with two generalized means

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We discuss a generalization of e-geodesic and m-geodesic, which provides a natural extension for the standard framework of information geometry. The main idea is to employ quasi-arithmetic and quasi-harmonic means for positive numbers. The generalized e-geodesic is defined by the quasi-arithmetic mean, which associates with the canonical divergence and the generalized expectation; the generalized m-geodesic is defined by the quasi-harmonic mean, which is characterized to preserve the generalized expectation. We elucidate that there is a variety of generalization for the standard framework in which the space of probability density functions is viewed as a dual Euclidean space in the sense that the Pythagoras theorem holds via the generalized e-geodesic and m-geodesic.