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Polar Factorisation of Vector Valued Functions, with Application

A vector-valued function is said to have a polar factorisation if it can be written as the composition of the gradient of a convex function with a measure-preserving mapping. This concept was introduced by Y. Brenier, and has been applied to identification of the trajectory mapping for the semigeostrophic equations, a model for weather front formation. We discuss recent results concerning existence and uniqueness of polar factorisations, and the link with L^2 projections onto the set of measure -preserving mappings.