OPTIMIZATION ON MATRIX MANIFOLDS: A COMPUTATIONAL POINT OF VIEW

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Abstract: Over the past few decades, optimization on manifolds has received increasing interest in research and engineering, recognized as a wide, beautiful and effective generalization of unconstrained optimization. These problems arise often in engineering applications, including in machine learning, computer vision, signal processing, dynamical systems and scientific computing. Involving a Riemannian structure on smooth manifolds is sufficient to define gradients and Hessians on the manifold, paving the way for optimization. Hence, we can generalize the standard algorithms from unconstrained optimization to handle the broader class of optimization over smooth manifolds. My talk is concerned with some specific manifolds including the Stiefel manifold, the symplectic Stiefel manifold, and fixed-rank manifolds. The purpose of my talk is to develop efficient algorithms for solving optimization problems on these manifolds and to study the Riemannian structure of manifolds.