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Molei Tao*, Georgia Tech, Atlanta, GA 30332, and **Tomoki Ohsawa**. *Variational Optimization on Lie Groups, with Examples of Leading (Generalized) Eigenvalue Problems*.

We consider the optimization of smooth functions defined on Lie groups. By generalizing NAG variational principle in vector space (Wibisono et al., 2016) to Lie groups, continuous Lie-NAG dynamics which are guaranteed to converge to a local optimum are obtained. They correspond to momentum versions of gradient flow on Lie groups. A particular Lie group of $SO(n)$ is then studied in details, with objective functions corresponding to leading Generalized Eigenvalue problems: the Lie-NAG dynamics are first made explicit in coordinates, and then discretized in a structure preserving fashion, resulting in optimization algorithm with faithful energy behavior (due to conformal symplecticity) and exactly remaining on the Lie group. Numerical experiments on both synthetic and practical problems demonstrate the effectiveness of the proposed algorithm. (Received January 12, 2021)