

Coordination on Lie Groups

Rodolphe Sepulchre^{†*}, Alain Sarlette[†], Silvère Bonnabel[‡]

[†]Department of Electrical Engineering and Computer Science,
University of Liège

<http://www.montefiore.ulg.ac.be/~sepulch/>

[‡]Ecole de Mines de Paris

*Corresponding Author: sepulch@montefiore.ulg.ac.be

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Lie Groups are the natural state-spaces of models describing the motions of moving bodies. Because of their prevalence in applications and because of the rich geometric structure of these nonlinear spaces, the theory of control systems evolving on a Lie group has been a core development of nonlinear control theory. In this talk we study the coordination problem for systems evolving on Lie groups. We show that the essence of coordination on Lie groups is a consensus problem in the corresponding Lie algebra. We use this characterization to develop a systematic and general approach to the design of coordinating control laws on Lie groups. The theory is illustrated on the coordination of rigid bodies evolving on the Lie groups $SE(2)$, $SO(3)$, and $SE(3)$.
