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Exponential map for general sprays and connections

An important class of systems of second order differential equations can be represented as generalized aprays on a manifold M with tangent bundle $TM \to M$. Quadratic sprays correspond to symmetric linear connections on $TM \to M$; and it is well known that the exponential map is a local diffeomorphism in this case.

There is a corresponding set of locally diffeomorphic exponential maps that can be defined for *any* spray or connection, which satisfies certain properties, which we will discuss. A general Jacobi map will also be discussed.

Reference: L. Del Riego, and Phillip E. Parker, Pseudoconvex and Disprisoning Connections, Preliminary Report.