Linear Equations and Lie Quadratics

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Abstract

Consider an ordinary differential equation

$$\frac{dx}{dt} = B(t)x(t)$$

for a curve $x : \mathbb{R} \to \mathbb{R}^3$, where $B(t)$ is a skew-symmetric 3×3 matrix affinely dependent on t.

The theory of Lie quadratics and Riemannian cubics will be briefly reviewed, then applied to reveal some mathematical structure associated with this elementary linear ODE with (slightly) variable coefficients.