

Meeting: 1006, Lubbock, Texas, SS 11A, Special Session on Future Directions in Mathematical Systems and Control Theory

Matthias Kawski* (kawski@asu.edu), Tempe, AZ 85287. *On Agrachev's curvature of optimal control.* Preliminary report.

Necessary conditions for optimality such as the Pontryagin Maximum Principle (and various high-order generalizations) single out sets of candidates for optimal trajectories. But in general it is much harder to assert whether such extremals are indeed minimizing. Here Agrachev's recently introduced curvature of optimal control provides a new geometric sufficient condition for optimality. While it generalizes the classical Gauss curvature, it has been hard to get an intuitive feeling for this new object. This is largely due to being defined on a circle-subbundle of the cotangent bundle as opposed to being a function of the state-manifold as is the case of the Gauss curvature.

We discuss several special classes of systems, and present computer tools that allow one to visualize this curvature and its interplay with (de-)focussing extremals, and we show how this curvature is related to recent results by Chitour and Sigalotti on the controllability of the Dubin's problem on surfaces. (Received February 02, 2005)