Singularities of attainable sets of control-affine systems in $\mathbb{R}^3$

I. A. Bogaevsky

Moscow State University, NIISI RAN

bogaevsk@mccme.ru

A point of a control-affine system in three-dimensional space with a disk of admissible velocities can be elliptic, hyperbolic, or parabolic (provided the system satisfies some non-integrability condition). We describe the attainable sets of typical elliptic and hyperbolic points for small times. It turns out that the boundary of such a set is contained in the front of one of the two universal Legendre submanifolds (elliptic or hyperbolic) which are described explicitly and have singularities. The proof is based on V. I. Arnold's theory of interior scattering of linear waves.