

# The One-Sided Lipschitz Condition for Differential Inclusions

Elza Farkhi

Abstract:

Differential inclusions appear naturally in the control theory and in differential equations with discontinuous or uncertain right-hand sides. The classical stability theory of ODEs and their discrete approximations usually requires Lipschitz continuity of the right-hand sides with respect to the state variable. The weaker one-sided Lipschitz (OSL) condition, well-known in the theory of stiff ODE, has a proper extension to set-valued functions, generalizing the Lipschitz condition and notions of dissipativity/ monotonicity of single-valued and set-valued maps. This condition yields weak exponential Lipschitz stability of the trajectories set. In this talk we will present some results on stability, approximations and relaxation of ordinary differential inclusions (equations) and related control problems, involving variants of the OSL condition.