

Convergence of regularised solutions of piecewise smooth differential equations

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We study piecewise smooth differential equations in which the discontinuity of the vector field occurs on two smooth surfaces of the phase space and may result in codimension-2 sliding.

First we will regularise the associated differential inclusion with a small regularisation parameter ϵ . Based on the ideas presented in [1] and [2], especially some asymptotic expansion techniques, we will then discuss the linear convergence of the regularised solutions in ϵ for the most common cases.

Finally we will analyse some problems given from electrical engineering and validate the theoretical result.

[1] N. Guglielmi und E. Hairer. Classification of hidden dynamics in discontinuous dynamical systems. In: *SIAM Journal on Applied Dynamical Systems*, 14(3): 1454-1477, 2015.

[2] N. Guglielmi und E. Hairer. Solutions leaving a codimension-2 sliding. In: *Nonlinear Dynamics*, 88(2): 1427-1439, 2017.