# Recursive Subspace Identification for Discontinuous State Space Systems in the case of Filippov Sliding

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We will consider systems of ordinary differential equations (ODEs) with discontinuous right-hand side, i.e. piecewise smooth (PWS) systems. The surfaces that divide the state space in the continuous regions are called switching surfaces. Filippov and Utkin [1] pioneered the mathematical treatment of PWS systems, describing the phenomenon of sliding of the trajectory on the switching surfaces in particular situations.

Because of the various applications in which these systems arise (engineering, control theory, biology), it is of great relevance to develop theoretical and numerical methods to understand, simulate and build from experimental data this kind of systems [2].

For this reason we analyze the problem of identification of the parameters of a linear problem in the state-space form in the case of discontinuous inputs: the aim is to estimate these inputs from output data in situations in which their measurement is not possible. We will consider state-of-the-art methods for Recursive Subspace Identification [3], characterized by the use of singolar value decomposition (SVD) and QR factorization and its updating with Givens rotations. After applying these methods to the case described above, we will present some key issues in this topic.

## References

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