Robustness of various controllability properties under sampling

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ABSTRACT

I will report on a series of works [1]-[2]-[3]-[4] done with *Loïc Bourdin* from *Université de Limoges*, with whom we have investigated the following general question: given a control system, do we have have robustness under control sampling of various controllability or stabilization properties?

This question has been much investigated in the past, in particular by K. Grasse, E. Sontag, H. Sussmann. I will give the state-of-the-art and provide new results.

References

[1] L. Bourdin, E. Trélat, *Robustness under control sampling of reachability in fixed time for nonlinear control systems*, Math. Control Signals Systems **33** (2021), no. 3, 515–551.

[2] L. Bourdin, E. Trélat, *Unified Riccati theory for optimal permanent and sampled-data control problems in finite and infinite time horizons*, SIAM J. Control Optim. **59** (2021), no. 2, 489–508.

[3] L. Bourdin, E. Trélat, *Linear-quadratic optimal sampled-data control problems: convergence result and Riccati theory*, Automatica J. IFAC **79** (2017), 273–281.

[4] L. Bourdin, E. Trélat, *Optimal sampled-data control, and generalizations on time scales*, Math. Control Relat. Fields **6** (2016), no. 1, 53–94.