

**ON THE ATTAINABILITY PROBLEM UNDER STATE CONSTRAINTS WITH
PIECEWISE SMOOTH BOUNDARY**

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The paper is devoted to the problem of approximating reachable sets for a nonlinear control system with state constraints given as a solution set of a finite system of nonlinear inequalities. Each of these inequalities is given as a level set of a smooth function, but their intersection may have nonsmooth boundary. We study a procedure of eliminating the state constraints based on the introduction of an auxiliary system without constraints such that the right-hand sides of its equations depend on a small parameter. For state constraints with smooth boundary, it was shown earlier that the reachable set of the original system can be approximated in the Hausdorff metric by the reachable sets of the auxiliary control system as the small parameter tends to zero. In the present paper, these results are extended to the considered class of systems with piecewise smooth boundary of the state constraints.

Keywords: reachable set, state constraints, penalty function, approximation, Hausdorff metric.

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