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Robert Sizemore* (rsizem2@lsu.edu), Department of Mathematics, Louisiana State University, 301 Lockett Hall, Baton Rouge, LA 70803-4918. *Adaptive Planar Curve Tracking Control and Robustness Analysis under State Constraints and Unknown Curvature.*

We provide adaptive controllers for curve tracking in the plane, under unknown curvatures and control uncertainty, which is a central problem in robotics. The system dynamics include a nonlinear dependence on the curvature, and are coupled with an estimator for the unknown curvature, to form the augmented error dynamics. We prove input-to-state stability of the augmented error dynamics with respect to an input that is represented by additive uncertainty on the control, under polygonal state constraints and under suitable known bounds on the curvature and on the control uncertainty. When the uncertainty is zero, this gives tracking of the curve and convergence of the curvature estimate to the unknown curvature. Our curvature identification result is a significant improvement over earlier results, which do not ensure parameter identification, or which identify the control gain but not the curvature. This work is joint with Profs. Michael Malisoff from the Louisiana State University Department of Mathematics and Fumin Zhang from the Georgia Institute of Technology School of Electrical and Computer Engineering. (Received April 26, 2016)