

Title: On the Existence and Uniqueness of Poincaré Maps for Systems with Impulse Effects

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Abstract: The Poincaré map is widely used in the study of the qualitative behavior of dynamical systems. For instance, it can describe the existence and stability behavior of periodic solutions. The Poincaré map for dynamical systems with impulse effects was introduced in the last decade, and has mainly been employed to study the existence of periodic gaits (limit cycles) in locomotion for bipedal robots. In this talk, we investigate the necessary and sufficient conditions for the existence and uniqueness of Poincaré maps for dynamical systems with impulse effects evolving on a differentiable manifold. If time permits, I will apply the results to show the existence of Poincaré maps for systems with multiple domains, and for the 2D spring loaded inverted pendulum.