Coloquio Queretano de Matemáticas

Viernes 30 de Agosto@ 1pm

Tracking control for simple mechanical systems on Lie groups

Yu Tang
NingboTech University of Zhejiang, China

The first part of this talk gives a brief review of the recent development of common control methodologies for simple mechanical systems on Lie groups, including feedback -by-linearization like control, PID control, and sliding mode control. These methodologies are widely known for systems evolving on Euclidean space. When extended to systems whose configuration space is a Lie group, control designs must take the underling geometric characteristics into account, because the topological structure of the configuration space and the tangent space are very different. The main problem is thus how to endow the state space (the tangent bundle) with a group structure so that the salient features of conventional control designs in Euclidean space may be inherited on a general Lie group. The second part of the talk presents a novel attitude controller on the 3D-unit sphere based on sliding mode. The tangent bundle of the Lagrangian dynamics that describes the rotational motion of a rigid body is first equipped with the Lie-group structure, then a sliding subgroup emerged on it is defined. Next, a sliding-mode controller is designed for attitude tracking that relies on an intrinsic error defined on the Lie group. Almost global asymptotic stability of the closed loop is demonstrated.

investigación **teoria de control** **ecuaciones diferenciales**

Evento hibrido, con transmisión en vivo
presencial: Aula Teórica, IM-UNAM Juriquilla
virtual: Zoom ID: 979 443 2722 pass: DRvwX2

coloquio-queretano@im.unam.mx matem-juriquilla.unam.mx/coloquio

Nodo Multidisciplinario de Matemáticas Aplicadas

Instituto de Matemáticas

UNAM Juriquilla