

Im Oberseminar

Deformationsquantisierung

spricht am **07.12.18 um 14 Uhr c.t.**,

im Seminarraum SE 30

JOCHEM TRUMPF

über das Thema:

Exploiting symmetry in observer design for flying robots

Many mechanical systems exhibit continuous symmetries that lead to dynamic models for those systems where the state space carries the structure of a homogeneous space of the symmetry Lie group. These models are prevalent in mobile robotics where such symmetries ultimately derive from the physical fact that the laws of rigid body motion are invariant to a change of reference frame.

Control theory for systems on Lie groups and homogeneous spaces is a well developed subject that has been studied since the 1970s with several popular textbooks available. In contrast, observer theory for such systems is much less developed and real progress on observer design principles for such systems has only been made in the last 10 years.

In this talk I will summarize the current state-of-the-art in observer design for kinematic systems with complete symmetries and show examples of applications of this theory to mobile robotic systems. The resulting state estimation algorithms are computationally much simpler than the alternative stochastic filters but show similar practical stability and robustness properties. Most of the observers in this talk have existing real-time implementations in on-board embedded hardware.

gez. Knut Hüper