UNIVERSITÄT DES SAARLANDES
Fakultät für Mathematik und Informatik
Fachrichtung Mathematik

Mathematisches Kolloquium

Am **Freitag**, dem 7. Februar 2025, spricht um **14 Uhr c.t.** im Hörsal IV der Fachrichtung Mathematik, Gebäude E2.4, Teams-Link,

Prof. Dr. Kathrin Flaßkamp
Universität des Saarlandes

über das Thema:

Motion Planning with Motion Primitives: From differential geometry via graph-search to reinforcement learning – and back

Abstract:
This talk is based on the concept of motion planning for dynamical systems via motion primitives. In a differential geometric setting, motion primitives can be introduced as equivalence classes of Lie group symmetries for dynamical control systems and, in particular, relative equilibria as symmetry-generated motions. Thus, they are natural choices for setting up a library of representative primitives, which themselves save intrinsic dynamic behavior through time discretization and state space quantization. This approach opens up a variety of options for solving the motion planning problem: We will briefly look into graph-based planning via hybrid $\mathcal{A}^*$ search as well as into reinforcement learning with motion primitives. Lastly, we return to our starting point, namely controlling a dynamical system, and answer the question of whether motion primitives are optimal choices in a certain sense. Among others, the concept of motion planning with motion primitives can be applied to trajectory generation in robotics and autonomous driving.

Alle Interessenten und Interessentinnen sind zum Vortrag herzlich eingeladen. Der Vortrag findet im **hybriden Format** statt.

Die Dozenten der Mathematik