

Mathematisches Institut  
der Universität Bayreuth

Prof. Dr. V. Aizinger    Prof. Dr. M. Bebendorf  
Prof. Dr. K. Chudej    Prof. Dr. L. Grüne  
Prof. Dr. A. Schiela

95440 BAYREUTH  
TEL: (0921) 55-3270  
TELEFAX: (0921) 55-5361

BAYREUTH, DEN 07.11.2022

## VORTRAGSANKÜNDIGUNG

Im Rahmen unseres gemeinsamen Oberseminars

„Numerische Mathematik, Optimierung und Dynamische Systeme“

spricht

Herr **Dr. Luca Saluzzi**  
Imperial College London

**am Dienstag, 29.11.2022, 16 Uhr s.t.**                      über das Thema

**"A Data-Driven Tensor Train Gradient Cross approximation for Hamilton-  
Jacobi-Bellman equations"**

*Abstract:*

*Hamilton-Jacobi-Bellman (HJB) equation plays a central role in optimal control and differential games, enabling the computation of robust controls in feedback form. The main disadvantage of this approach depends on the so-called curse of dimensionality, since the HJB equation and the dynamical system live in the same, possibly high dimensional, space. In this talk, I will present a data-driven method for approximating high-dimensional HJB equations based on tensor decompositions. The approach presented in this talk is based on the knowledge of the value function and its gradient on sample points and on a tensor train decomposition of the value function. The collection of the data will be derived by two possible techniques: Pontryagin Maximum Principle and State-Dependent Riccati Equation. The numerical experiments will demonstrate linear complexity in the dimension and a better stability in presence of noise. Finally, I will present an application to an agent-based model and a comparison with a Deep Learning technique.*

Das Oberseminar findet im S 82, Gebäude NW II statt.

gez. Lars Grüne