Kolloquium Angewandte Mathematik
Prof. Thomas Apel (BAU1)
Prof. Matthias Gerdts (LRT1)
Prof. Markus Klein (LRT1)

der Bundeswehr
Universität München

Vortragsankündigung

Am **Donnerstag, den 07.12.2023,** hält **um 17:00 Uhr**

Dr. Max Winkler
(Technische Universiät Chemnitz)

einen Vortrag über das Thema

Agent-based optimization of pedestrian dynamics via local attraction

Der Vortrag findet im **Raum 0401** in **Gebäude 33** statt.

Vortragszusammenfassung

We study an optimization problem for pedestrian dynamics aiming at a fast evacuation of a crowd in case of an emergency situation. The forward model, the so-called Hughes model, consists of a nonlinear transport equation describing the motion of the pedestrians, coupled with an Eikonal equation whose solution provides the direction towards the next emergency exit. For an optimization of that process we add agents which are individuals of the crowds as well, but have the ability to locally attract other pedestrians. By optimizing their trajectory and attraction intensity one can avoiding e. g. the case that too many pedestrians want to squeeze through the same exit whereas other exits are rarely used, so that the evacuation might be much faster.

We provide existence results and necessary optimality conditions for the resulting optimal control problem and present gradient-based optimization algorithms for a numerical computation. For the spatial discretization of the transport equation we use a finite volume scheme and show that important properties like mass-conservation and preservation of the natural bounds imposed on the pedestrian density function are retained. Furthermore, we show in numerical experiments that this optimization technique indeed leads to an improvement of an evacuation.

Alle Interessierten sind dazu herzlich eingeladen.