

Suggested Master of Science project at the division of Mathematics LTH and Numerical Analysis:

## **Optimization of pedestrian evacuation modelled by a PDE**

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Modelling of pedestrian flow can be made with a nonlinear partial differential equation (PDE), whose solution gives the pedestrian density along the path. The flux of pedestrians is a nonlinear function of the local density. The width of the path influences the density and thereby the flux. With special numerical methods one can simulate this behaviour. The main problem of the project is to investigate how the form of the path influences the evacuation of a crowd through an exit. Can the flux be optimized and what is the optimal form of the path? The project includes

- studies on the scalar hyperbolic conservation law PDE ,
- literature review on pedestrian evacuation,
- implementation of a numerical method for approximate solutions of scalar nonlinear hyperbolic PDEs,
- optimization of the narrowing path to an exit to maximize the total flux of people,
- simulations of different situations.