Optimization Integrator for Energy-Based Pedestrian Models
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Over the last two decades there has been a proliferation of methods for simulating pedestrian crowds. However, many of the existing approaches suffer from stability issues, with different interaction scenarios requiring different time steps to lead to collision-free and accurate behavior. In this talk, I will discuss how implicit integration and numerical optimization can be used to obtain robust, and provably collision-free simulations for systems that depend both on positions and velocities such as human crowds. The proposed approach is applicable to any simulation model where interactions are energy based. As an example, I will combine this new integration approach with a potential function derived from a recent analysis of pedestrian data. The result is high-fidelity simulations that are collision-free independent of the time step chosen, and robust to a wide range of scenarios, densities, and time steps.