JOHANNES KEPLER
UNIVERSITY LINZ

Bachelor's Thesis

Implementing a simple 2D physics engine

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Physics engines are used in various areas, e.g., game development, simulation, and movies. Typically, physics engines are categorized into 2D and 3D physics engines.

As part of this thesis a simple 2D physics engine, supporting discrete collision detection and collision resolution for circles, axis-aligned bounding boxes and arbitrary polygons should be implemented. Additionally, forces such as gravity should be considered and simple rotations for axis-aligned bounding boxes should be implemented. Only rigid bodies need to be considered for this work.

Goals of this thesis:

- Research up-to-date and reasonable algorithms for collision detection and collision resolution
- Implement a simple physics engine as described above
- Implement a simple 2D visualization to visualize the state of the world simulated by the physics engine
- Setup test scenes to test and illustrate the correctness of the physics engine

Modalities:
The progress of the project should be discussed at least every three weeks with the advisor. A time schedule and a milestone plan must be set up within the first four weeks and discussed with the advisor. It should be continuously refined and monitored to make sure that the thesis will be completed in time. The final version of the thesis must be submitted not later than 31.03.2023.