

RBE 550 – HW4 Section 6.3: Collision Checker
Student: Mohamed Eljahmi

Overview of SAT Collision-Checker

The collision-checker module uses the **Separating Axis Theorem (SAT)** to test overlap between the vehicle's oriented bounding box (OBB) and obstacle polygons.

For each polygon edge, an outward normal defines a projection axis. If any axis yields non-overlapping projection intervals, the polygons are disjoint and the pose is collision-free.

Figures 1 and 2 illustrate detected and non-detected overlap cases, while Fig. 3 shows the decision flow used in the implementation.

SAT-based Collision Check pseudo code

Function COLLIDES(pose, obstacles):

 veh_rect ← oriented box for vehicle footprint

 For each obstacle polygon:

 If polygons overlap via Separating Axis Theorem: return True
 return False

Flowchart

