

Title: A Hybrid Separating Axis Theorem (SAT) with Polygon Triangulation Based on Seidel's Algorithm for Collision Detection of 2D Closed-Polygon Objects

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ABSTRACT

Separating Axis Theorem (SAT), one of the algorithms to detect collision that were widely used in games and simulation. It is a method to determine either if two convex shapes are colliding. Its concept states that, if you can draw a line between the two objects therefore it is easy to say that the objects are not in total impact. Upon validating whether object A and object B is having a collision, the algorithm checks all the axis of the polygonal objects.

In computer graphics, Polygon Triangulations are commonly used to tessellating curved in geometries. As its names indicates, the process includes breaking a polygon into a triangle. Usually, a triangulation is to decompose the polygon into sets of triangles by a maximal set of diagonals that are not intersecting. Those set of non-intersecting diagonals should be set to maximal to make sure that no triangle has a polygon vertex in the interior of its edges.

It was shown in the study of the collision detection how the original Separating Axis Theorem differs from the proposed hybrid algorithm. The hybrid algorithm solves the loopholes of the original Separating Axis Theorem. The hybrid algorithm already solves the concave problem of the original Separating Axis Theorem

Keywords: Collision detection, Convex, Concave, Polygonal, 2D objects, Collider.