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Convex body collision detection using the signed distance function

L.F. Sánchez Merchante; P. López-Adeva Fernández-Layos

Abstract-

We present a new algorithm to compute the minimum distance and penetration depth between two Signed Distance Function (SDF). First, we formulate the problem as an ellipsoid algorithm to solve the problem when the two bodies are convex. Finally, we benchmark the algorithm and compare the results in Minkowski Portal Refinement (MPR) algorithms, which represent bodies using the support function. Results show that our algorithm has similar performance to both, providing penetration depth like MPR and, with better robustness, minimum distance like GJK. Our algorithm provides accurate and fast rigid bodies and is able to substitute existing algorithms in previous applications whenever the support function is replaced with the SDF.

Index Terms- Signed distance function; Collision detection; Ellipsoid method

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