*Using hash searches to determine if specialized convex shapes overlap in constant time*

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*Abstract*—I/We are going to do this project to create algorithms to determine if two convex shapes constructed using a set of points in 2D(/3D if possible) overlap by using a hash search that will give the indexes of points relevant in determining if there is overlap. (*Abstract*)

Keywords—component, formatting, style, styling, insert (key words)

# Introduction (*Heading 1*)

This project will create algorithms to determine if two convex shapes constructed from a set of points overlap. The shapes will be specialized so that in a convex 2D polygon made with a set of points, the angle between two connected points is always the same, or follows a predetermined pattern of angles that is ideally close to equal angles between sets of points. A specialized 3D shape will have similar restrictions.

The algorithms will determine if two convex shapes collide using the separating axis theorem by finding which surfaces of each shape are intersected by a line that is from the center of the first shape and center of the second shape. The separating axis theorem will only be applied to these two surfaces. Finding these surfaces will be done in constant time by using a hash search to find the indexes of the points that are used to make the surfaces.

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* Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.
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*a**b* 

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## Some Common Mistakes

* The word “data” is plural, not singular.
* The subscript for the permeability of vacuum **0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
* In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
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* There is no period after the “et” in the Latin abbreviation “et al.”.
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1. Table Type Styles

| Table Head | Table Column Head | | |
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1. Sample of a Table footnote. (*Table footnote*)
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##### Acknowledgment *(Heading 5)*

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

##### References

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