

Solution - Exercise [5]

Introduction to Computer Graphics - B-IT Master Course

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Theoretical Exercise

Clipping algorithms

This exercise refers to the "raster algorithms" slideset of the lecture.

1. Describe what changes are necessary to generalize the Liang-Barsky line clipping algorithm to n-dimensional space

We will need to use the same logic for 2D clipping (comparing the line with 4 intersection points, 2 for x and 2 for y) with the $2 \cdot n$ intersection points in n-dimensional space. The number 2 is because each line inside the volume has a maximum of 2 intersections (max and min). So for 3D space, with Liang-Barsky we will need to compare the lines with 6 intersection points (2 for x, 2 for y, and 2 for z)

2. Visualize the logic of the Sutherland-Hodgman polygon clipping algorithm using either a flow diagram or pseudo code

For Each Edge in clipping polygon

 create plane for edge

 For Each Vertex pair in subject polygon

 determine case number from starting vertex, ending vertex, and edge

 perform case operation

 End For Each

 update subject polygon with new vertices

End For Each