2D Computer Graphics

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IMPA

Abstract segments

Eliminating intersection computations

The bounding box for monotonic segments is tight

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Outside the bounding box, the problem is solved

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Outside the bounding box, the problem is solved

Inside bounding box, we used an implicit test

Eliminating intersection computations

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Works for linear segments

Eliminating intersection computations

The bounding box for monotonic segments is tight

Outside the bounding box, the problem is solved

Inside bounding box, we used an implicit test

Works for linear segments

Can we do the same for quadratics and cubics?

The problem with implicitization

Our segment is local to $t \in [0, 1]$, but the implicit is global

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Our segment is local to $t \in [0, 1]$, but the implicit is global

Must prove the curve does not reenter the bounding box for $t \in \mathbf{R} \setminus [0, 1]$

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Works for linear

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Works for linear

Fails for quadratics and for cubics

Solving the problem

Can we find a region where the implicit test is enough?

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The quadratic case

Solving the problem

Can we find a region where the implicit test is enough?

The quadratic case

The cubic case

References

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