

Exact Geodesic Algorithm Implementation

Gurvan L'Hostis

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# Exact Geodesic Algorithm Implementation Projet INF555

Gurvan L'Hostis

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### Introduction

An exact algorithm for computing geodesics on triangular meshes

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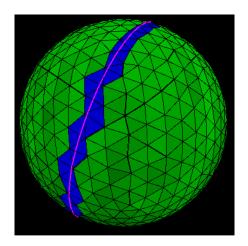
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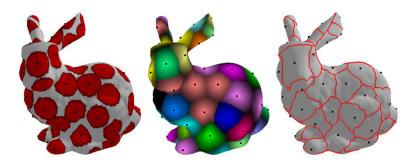
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Geodesic Remeshing Using Front Propagation, Gabriel Peyre (CMAP).



# Introduction Why computing geodesics?

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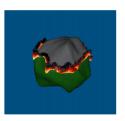
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Meshes on Fire; Haeyoung Lee, Laehyun Kim, Mark Meyer, Mathieu Desbrun (Caltech).



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A light source that illuminates through windows

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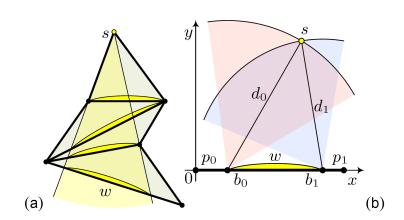
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$$w = (b_0, b_1, d_0, d_1, \sigma, \tau)$$



The saddle point issue

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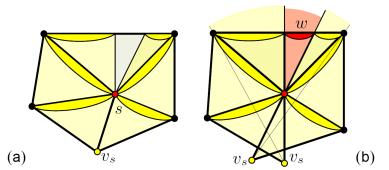
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The propagation method

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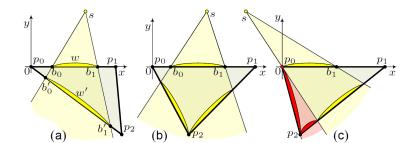
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The overlapping issue

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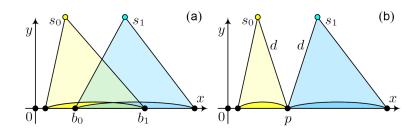
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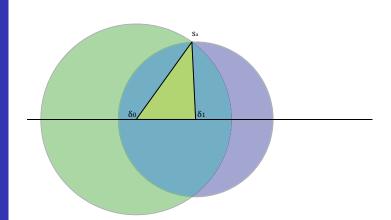
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# Distance field propagation The overlapping issue

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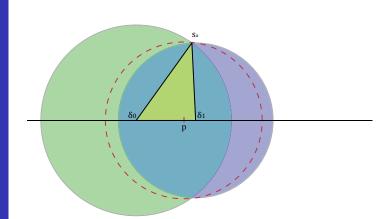
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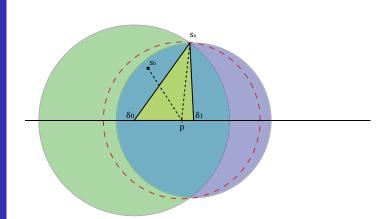
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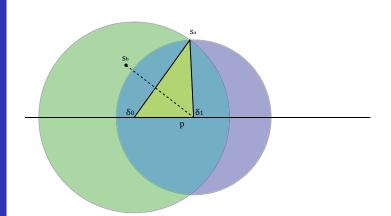
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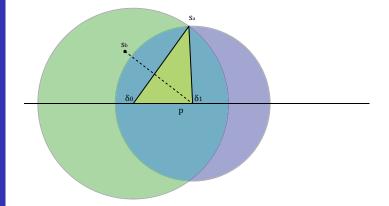
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 $d_0^a < d_0^b$  and  $d_1^a < d_1^b \iff a$  is better on the full interval



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### Backtracking

A path that goes back to the source thanks to windows

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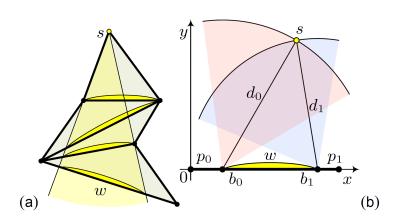
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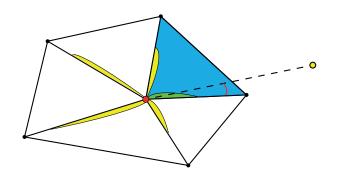




### Backtracking Starting from a vertex

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### Class structure

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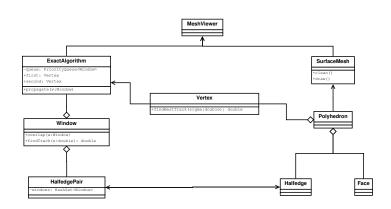
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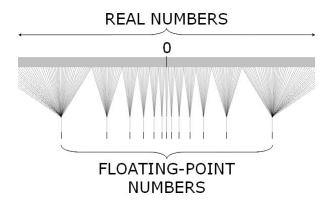
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# Demonstration