Titre : Multiresolution Volumetric Editing

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Description :

# Context

In computer graphics and animation, subdivision surfaces are widely used to create visually appealing 3D models [3]. When aiming for a plausible physical behavior of those models for 3D animation or games, physically-based simulation comes into play. Then, a volumetric mesh has to be generated from those models. In many cases, it takes several loops of design and simulation to adjust a 3D geometry so that it shows the intended behavior in the simulation. This work targets a tighter integration of 3D modeling and physically-based simulation in computer graphics.

## Goal

The goal of this internship is to set up a multiresolution volumetric editing tool. For this purpose, the main challenge is to enable volumetric editing primitives [2] in the multiresolution framework [1].

## Bibliography :

[1] Lionel Untereiner, David Cazier, Dominique Bechmann , n-Dimensional multiresolution representation of subdivision meshes with arbitrary topology, In Graphical Models, 2013
[2] Christian Altenhofen, Felix Schuwirth, André Stork, Dieter Fellner, Volumetric subdivision for consistent implicit mesh generation, In Computers & Graphics, 2017
[3] Denis Zorin, Peter Schröder, and Wim Sweldens, Interactive multiresolution mesh editing. In *Proceedings of the 24th annual conference on Computer graphics and interactive techniques* (SIGGRAPH '97),  1997

Remarques :
Equipe Inria Mimesis
co-advisor: David Cazier

Compétences: The candidates are expected to have skills in C++ development, physics based simulation, algebra/numerics, geometric modeling