

Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

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Název práce Deriving suitable surface shader and displacement map information from terrain erosion simulations

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Studijní program Informatika **Studijní obor** Počítačová grafika a vývoj počítačových her

Autor posudku Alexander Wilkie **Role** vedoucí

Pracoviště CGG KSVI MFF

Text posudku:

Goal of this thesis was to link the appearance modelling needed for realistic rock faces and mountain sides to erosion simulations.

Realistic pieces of geology, from individual rocks to entire valleys and mountain ranges, are frequently needed for plausible virtual outdoor settings in movie VFX work, and similar environments. Simulation software that can be used to compute the shapes of eroded mountainsides exists: but what has not been documented yet in open research literature is how to link the results of the simulation run with the assigning of appearance attributes in the final scene. This is necessary because if rocks are eroded by possibly multiple processes, such as thermal and hydraulic erosion, this will not only affect their shape (the main goal of erosion simulations), but also their appearance. And this thesis explores how to most efficiently extract the necessary information from the simulation run, and to use it in a modern industrial rendering system, namely RenderMan.

The thesis is well structured, as it first introduces the general problem, and then gives a background on the various erosion processes that can affect rock appearance. It then proceeds to explain the steps needed to extract data from the simulation, and how to process these, and bring them into a form that the shading subsystem of RenderMan can use. A key problem is matching the lattices found in the erosion simulation with the mesh that is used for the final terrain contour: and the thesis author manages to provide workable solutions for that. The various steps of the workflow are shown with illustrative figures that show what exactly is being done, and where the technical issues lie.

The results that are shown at the end of the thesis are not yet photorealistic images of rocks that are indistinguishable from photos of real geology: given the limited goals of a master's thesis, this was not to be expected (especially as a part of scene appearance is also usually due to artistic input, which was outside the scope of this work). However, the end results which are shown clearly

demonstrate that the approach taken by the candidate is viable, and that it fulfils the goals set for the thesis.

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

V Praze dne 4. 9. 2020

Podpis: