KTH Stockholm
EECS :: CST
Visualization, Autumn 2018, DD2257
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Homework assignment No. 05
Due October 4, 2018

Before beginning the assignment, use `git pull` to get the latest version of our Inviwo repository. Run CMake and compile once more.

The files `licprocessor.h/cpp`, `noisetexturegenerator.h/cpp` and `integrator.h/cpp` contain additional comments and instructions.

Task 5.1: Line Integral Convolution   20 P

Implement the Line Integral Convolution algorithm. See also Figure 1. Each of the following features gives a certain number of points, summing up to the total of 20 points:

(a) Random texture generation for textures of user-defined size (number of pixels) in x-direction and y-direction. (1 P)

(b) Base algorithm creating a LIC texture from a loaded vector field using either a randomly generated texture or a loaded image as the texture. You can use the box kernel for the convolution. (8 P)

(c) FastLIC. (5 P)

(d) User-defined kernel size. (2 P)

(e) Contrast enhancement after the convolution by adjusting the mean and standard deviation. (2 P)

(f) Ability to choose between a grayscale texture and a black-white texture for the randomly generated texture. (1 P)

(g) User-defined seed of the random number generator in order to create the same random texture with each run. (1 P)

The assignment comes with several vector fields for testing and Line Integral Convolution workspaces with randomly generated textures (`LIC_randomTexture.inv`) and loaded images (`LIC_loadImage.inv`). You may use other images then the ones provided.

Task 5.2: *(Extra Task)* Line Integral Convolution ++   5 Extra Points

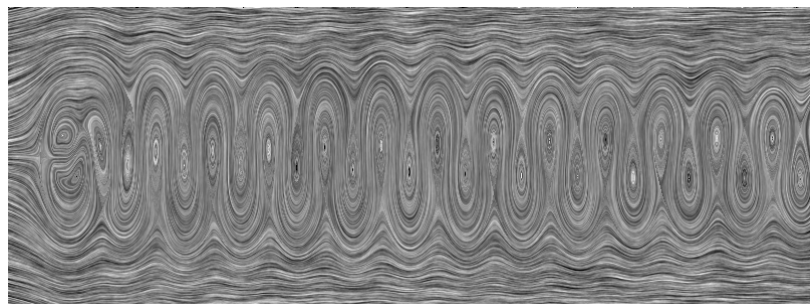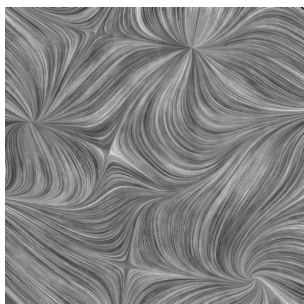Color the LIC texture according to the magnitude of the vector field.

Figure 1: Examples for Line Integral Convolution