University of Stuttgart
Institute for Visualization and Interactive Systems (VIS)

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Scientific Visualization (Assignment 7)

Exercise 7. 1 [4 Points] Glyphs

Suppose you have a weather dataset where each record consists of the following attributes: latitude, longitude, atmospheric pressure, wind direction on the ground, wind velocity, humidity, whether the location is populated, and temperature.

Design a glyph that represents these attributes. Your submission should provide an exemplary glyph, and an explanation of how you mapped the attributes to visual features. Try to represent attributes in a way that the viewer can grasp the meaning intuitively. You may get inspiration from the glyphs discussed in the lecture or from those that you may find in the literature.

Exercise 7. 2 [6 Points] Isolines

A two-dimensional scalar field is given by:

$$f(x, y) = (x - \frac{1}{2})^2 - y^2 \ .$$

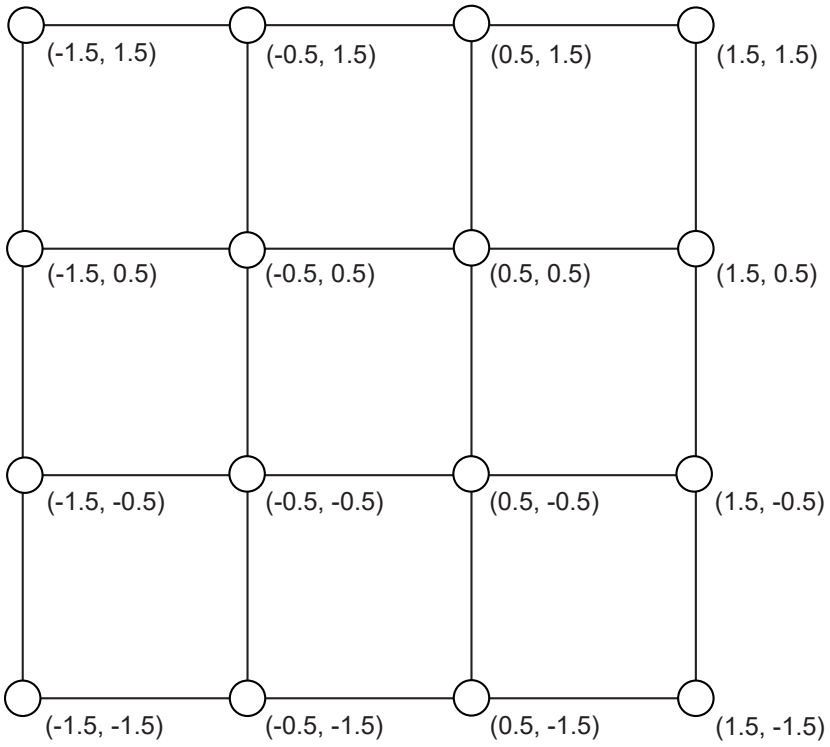

Figure 1: Grid for Marching Squares.

1. Evaluate the function at the sample points specified by the equidistant grid shown in figure 1. The coordinates of the grid points are given in parentheses. Round the function values to the first digit after the decimal point.

2. Calculate the isolines for $f(x, y) = 0$

   (a) approximately using the *Marching Squares* algorithm. Sketch the result.

   (b) analytically. Sketch the result and explain the differences to the approximated solution.

3. Is the Marching Squares algorithm suitable for parallelization? Explain in up to three sentences.

Submission Deadline: 19.06.2020, 23:55

please hand in your submission through the ILIAS system.