# Assignment 1

## Flow Data

10 Points for Homework

Due Tuesday, April 23rd, 23:59 (Paderborn time)

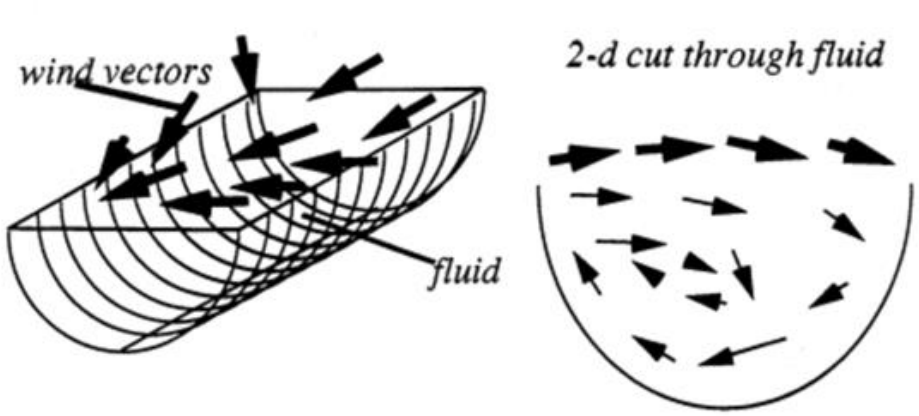
Upload your solutions to PANDA using the upload tool entitled with "Assignment 1". Your submission has to include the source code and screenshot(s) of your solution.

### 1. In class assignment:

Visualize the following vector field ($x_1$,$y_1$,$z_1$,$dx_1$,$dy_1$,$dz_1$, $x_2$,$y_2$,$z_2$,$dx_2$,$dy_2$,$dz_2$, …) where x, y, z is the start of a vector and dx, dy, dz its displacement. Use paper and pen.

1,1,0,2,0,0,3,2,0,2,0,0,2,2,0,0,3,0,4,4,0,2,3,0,6,4,0,3,1,0,7,6,0,2,2,0

### 2. Homework:




Use the data set provided under PANDA → Assignment 1. The data set is a snapshot of water flowing through a channel. Winds acting upon the (open) surface of the water create turbulences inside the water. Movements of water particles (caused by winds) were calculated by students in the first supercomputing class by Prof. Lloyd Fosdick, University of Colorado, 1992. File "field2.irreg" contains data describing the particle movement in a 2d slide perpendicular to the length of the channel. Data is given for a regular 82x82 grid in the following format: starting position (x,y,z) and relative movement (u,v,w).

Detailed format of field2.irreg:

| | |
|---|---|
| Integer value | Number of spatial dimensions ("3") |
| Integer value | Number of spatial dimensions ("3") |
| 3 Integer values | Describing the the extension in each dimension:<br>(Dim_x, Dim_y, Dim_z)=(„82, 82, 1") |
| Integer value | Number of spatial dimensions ("3") |
| Real array of dimensions (6,82,82,1) | First value "6" describes the number of data entries for each vector, followed by "x,y,z,u,v,w" as described above. |

Use any programming language to visualize the data set. Suggested user tasks to support: provide a visual overview of the data; show symmetry in the flow; effective visual identification of quickest and slowest movements without losing sight on the whole flow.
Make sure your solution is scalable and will also work with large data sets (MS Excel, or PhP, Java Script, and other Web Scripting languages will NOT work for future assignments).

*Hint*: Several visualization techniques will lead to a "correct" visualization. Try to pick one visualization technique that you are able to do and that aids in the interpretation of this numerical data set. "Correct" will be a visualization that displays all of the data (not more, not less) correctly. Of course, if you want to go beyond just "correct", you may think of displaying it in a way so that any of the above named user tasks can be interpreted quickly.

The points you will receive for this assignment depend upon the correctness of your solution.