

LIC, UNIK4660 Obligatory Assignment

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1 Introduction

The aim of this assignment is to present the elementary principles and implementation of the LIC algorithm. We will then use LIC to visualize two datasets with a white-noise filter.

2 HDF5

The datasets are in a vectorformat, stored in the HDF5 format. In order to extract the vector-field data, we need to use the HDf5 library, written in, but perhaps not exclusively in, both PYTHON and C/C++. For this assignment I'll be using C++ for the integration and PYTHON(2.7) for the visualization.

Below is the code that extracts the data:

```
1 void
2 init(hid_t file, hid_t dset, hid_t dset2, herr_t status, herr_t
   status2, double* rdata, double* rdata2){
3
4     file = H5Fopen (FILE, H5F_ACC_RDONLY, H5P_DEFAULT);
5     dset = H5Dopen (file, DATASET, H5P_DEFAULT);
6     dset2 = H5Dopen (file, DATASET2, H5P_DEFAULT);
7
8     status = H5Dread (dset, H5T_NATIVE_DOUBLE, H5S_ALL, H5S_ALL,
   H5P_DEFAULT, rdata);
9     status2 = H5Dread (dset2, H5T_NATIVE_DOUBLE, H5S_ALL, H5S_ALL
   , H5P_DEFAULT, rdata2);
10 }
```

This function takes two array's pointers, rdata and rdata2, and fills the arrays with the vector-field data. First the function opens the file whose name is stored as a string in the "FILE" variable. It then splits the dataset into its x and y sub-datasets seperately. These datasets are then "read", or rather inserted, into the rdata arrays thanks to the H5Dread method.

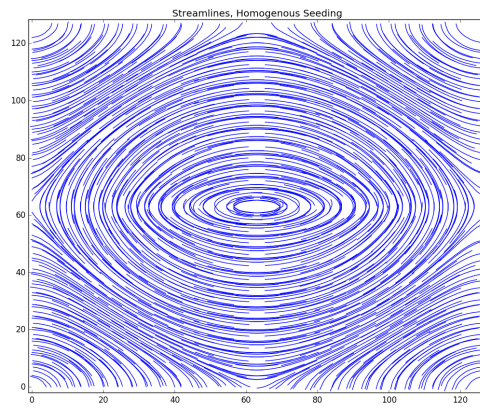


Figure 1: 1000 streamlines integrated with the forward Euler algorithm in the Metsim set. The seeding is homogenously distributed through the vectorfield.