

4th International PIV Challenge

Test case F

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1. Introduction

Right before the lunch time of 5th July, you may download a particle image pair we will provide, and you can process the images to compute displacement vector field on your PC. Until the end of the lunch time, you should upload your vector file via internet, and we will present the results to compare at the end of the workshop.

- + You can use either your house-made software or commercial software to process the images.
- + To make the competition fair you must do the evaluation fully alone, as any interaction with others would bias the outcome.
- + Detail of the flow field will not be disclosed until the presentation.

Please read following instruction that describes data format, grid information and file name convention.

2. Data Format, Vector grid, Desired Quantities and Name Convention

The double frame images are provided in uncompressed b/w 8 bit BMP, compressed b/w 8bit TIFF and video AVI format. Total number of images is 2, and they have a resolution of 1024x1024 pixels each and they are named F_00001.tif, F_00002.tif for TIFF and F_00001.bmp, F_00002.bmp for BMP format. File name with odd and even number is the first and the second frame of the image, respectively.

2.1 Data format and vector grid

The evaluated data must be provided in the following ASCII data format. Participants have to upload the files by themselves to the on-site server, where participants adjust the format of the data to fit into the common format. An URL for uploading files will be provided by e-mail to individual participant.

Data format:

- + One file should contain both position (x and y) and displacement (Vx and Vy) evaluated from an image pair.
- + Each line of the file should contains x, y, Vx and Vy at a measurement grid point. Flag is also allowed, but not necessary. While the order of the variable can be free, it should be consistent throughout all files.
- + Order of lines is free.
- + A character separating each variable should be space, tab or comma.
- + At the top of the file, header lines are also allowed. The header lines will be eliminated by participants on the server.

An example of the file is as follows:

```
'x' 'y' 'Vx' 'Vy' 'Flag'  
288.0 256.0 5.45732 6.78354 1  
288.0 264.0 5.14894 5.97568 1  
...  
800.0 760.0 6.52546 7.57974 1  
800.0 768.0 5.51846 4.27974 1
```

The convention for “Flag” is as follows:

- “0” Not valid
- “1” Valid
- “2” Interpolated

The data must be provided exactly on the following grid:

Vector grid: The locations of the vector grid points in pixel are:

X = 32 to 992 with a grid distance of $\Delta x = 8 \text{ px} \rightarrow 121 \text{ nodes}$

Y = 32 to 992 with a grid distance of $\Delta y = 8 \text{ px} \rightarrow 121 \text{ nodes}$

Origin: The origin (0,0) of the grid is in the upper left corner of the raw images. Thus the center of the upper left pixel is located at (0.5,0.5).

When Particle Tracking Velocimetry (PTV) is used for data evaluation, the displacement information must be interpolated on the grids specified above. The participants are free to choose the interpolation scheme. The Flag for PTV may only be “0” or “1”. In regions where

no particles are identified, a displacement of 0 and a Flag "0" may be specified.

2.2 Desired Quantities and Name Convention

The evaluation must be performed by correlating the following image pairs:

"F_00001.tif" with "F_00002.tif" → Result (displacement vectors [px]) is stored in "eval.dat"

The destination file name can be any name, e.g. test.txt or a0001.dat.

The participants must fill out the form on the web to describe the parameters / methods which have been used for the evaluation.

When PTV evaluation is performed, the particle displacements are determined from the same images as specified for the PIV evaluation. Displacements are interpolated to the grid specified in section 3.1.