

S1 Code. PIV for 3D data

The PIV_multi_mpi.cc program can quantify the velocity field in a 3D image sequence

Environment	<ul style="list-style-type: none">• A PC cluster with a Linux OS is required.• MPI must be installed in the PC cluster.• This program includes tiffio.h from libtiff library; therefore, libtiff library must be installed.
Input	<ul style="list-style-type: none">• Images must be in .tif format.• Image sequences must be divided according to time.• All input files must be kept in a common folder.
Output	<ul style="list-style-type: none">• Output files will be named “130321_3DPIV_WORM02_EMB04_LEFT00_param3_cytoxxxxT0yy yy.txt, in which the velocity from t = xxxx to t = yyyy is output.• The first to fourth columns of the output files are x-, y-, and z-axis components of the velocity.• The prefix “130321_3DPIV_WORM02_EMB04_LEFT00_param3_cyto”, can be modified on line 230.
Parameters	<ul style="list-style-type: none">• Line 16: kansoku is the distance between two mutually adjacent points in the x and y directions.• Line 17: kensa is (xy side length of the interrogation window – 1)/2. This value is larger than 14.• Line 18: kensa_z is (z side length of the interrogation window – 1)/2• Line 19: kouho is the range of the search for motion in the xy direction.• Line 20: kouho_z is the range of the search for motion in the z direction.• Line 24: def_tate must be set as the height of the image.• Line 25: def_yoko must be set as the width of the image.• Line 26: def_takasa is the number of slices in the image.• Line 27: sentou_file_num is the number allocated to the initial image. For example, to process numbered images from image_100.tif to image_200.tif, sentou_file_num = 100.• Line 84: dirname[MAX_CHAR_NUM] must be set as the name of the folder in which data is stored.
Usage	<ol style="list-style-type: none">1. Data must be stored in one folder and PIV_multi_mpi.cc in another folder.2. Set all parameters.3. Compile PIV_multi_mpi.cc as an MPI source code.4. Run the execution file from the command line.