Rotorbit Engineering

PAVLOV Library

PortAble Visualization Library for sOlVers

Version 1.0

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1 Introduction

This is a documentation about the Rotorbit PAVLOV (PortAble Visualization Library for sOlVers) library. Pavlov aims to help users and developers to have an easy access to most the scientific data formats.

The supported file formats are VTK[1] and XDMF[2] (through HDF5[3]). User can generate output data with one or multiple types simultaneously with the appropriate function calls.

The installation procedure is done via CMake[4]. Once installed, by including the appropriate header file in your code, functions can be called for output file generation. Detailed explanation of these functions can be found in Section 2.

2 PAVLOV API

void **pavlov_createUnstructuredMesh**(

string fileName, *int* numNodes, *int* numNodesPerCell, *int* numCells, *double* *x, *double* *y, *double* *z, *int* **cellCon, *string* fileType

)

Description

This function creates a vtk type output file in vtu format.

Parameters

Below are the definitions of the parameters in the function.

fileName
the name of file that wants to be created by the user, relative to the directory where the user executable will be run (e.g. "test", the extension will be appended by Pavlov depending on the file type supplied (e.g. "VTK"), where a file "test.vtu" will be generated.)

numNodes
the number of nodes (points) present in the mesh

numNodesPerCell
the number of nodes per cells (e.g. 8 for cubes)

numCells
the number of cells present in the mesh

x
pointer to the array that stores the x position of the nodes

y
pointer to the array that stores the y position of the nodes

z
pointer to the array that stores the z position of the nodes

cellCon
pointer to the two dimensional array that stores the cell connectivity (first index should be cells, second should be node list for the cell, e.g. cellCon[i][j], i for the cell index, j for the node index fot the i^{th} cell)

fileType
type of the file that is to be generated (e.g. for vtk type, "VTK")

void **liberVisuXMF**(

string fileName, *string* gridName, *string* topoType, *int* nodeNum, *float* *pos_x, *float* *pos_y, *float* *pos_z, *int* cellNum, *int* nodePerCell, *int* **cells, *char* **varName, *char* **varType, *int* *varLength, *int* varSize, *float* **varMatrix
)

Description

This function creates a xdmf type output file in xmf format using hdf5.

Parameters

Below are the definitions of the parameters in the function.

fileName
the absolute path to the output directory + filename

nodeNum
number of nodes present in the mesh

pos_x
pointer to the array that stores the x position of the nodes

pos_y
pointer to the array that stores the y position of the nodes

pos_z
pointer to the array that stores the z position of the nodes

cellNum
number of cells present in the mesh

nodePerCell
number of nodes per cells

cells
pointer to the two dimensional array that stores the cell connectivity

varName
pointer to the array that stores the variable names

varSize
number of variables that are passed

varMatrix
pointer to the two dimensional array that stores the variable value arrays(cell or node based)

References

[1] Visualization Tool Kit, Page *http://www.vtk.org/*

[2] Extensible Data Model Format, Page *http://www.xdmf.org*

[3] Hierarchical Data Format Group, Page *http://www.hdfgroup.org/HDF5/*

[4] Cross-platform, open-source build system, Page *http://www.cmake.org/*