



Pre-processing and User Friendly Interface

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2nd DualSPHysics User Workshop, 6-7 December 2016

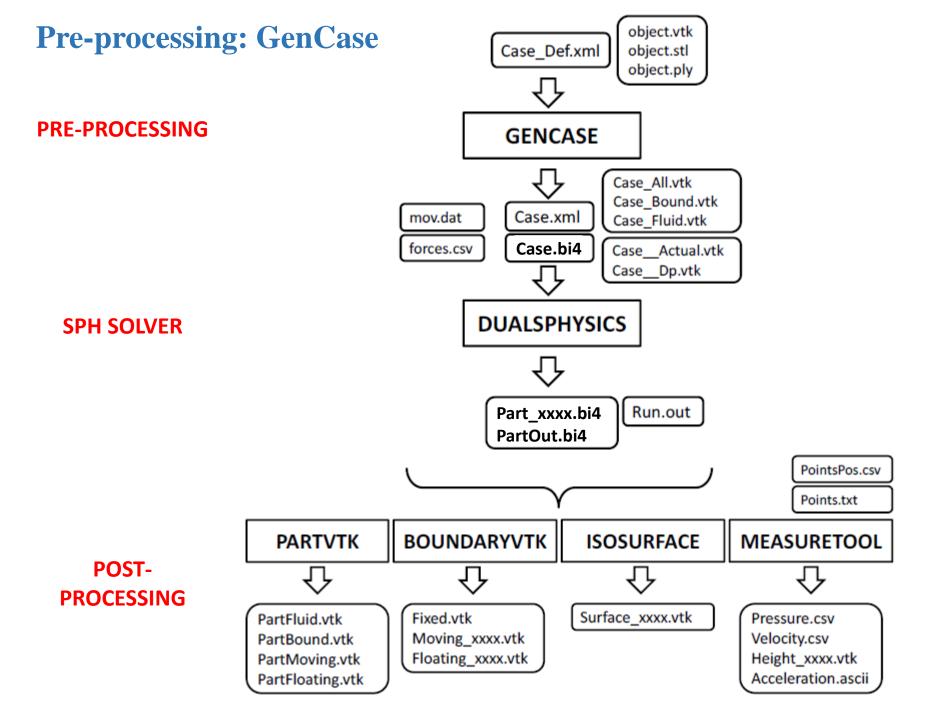
Outline of Presentation

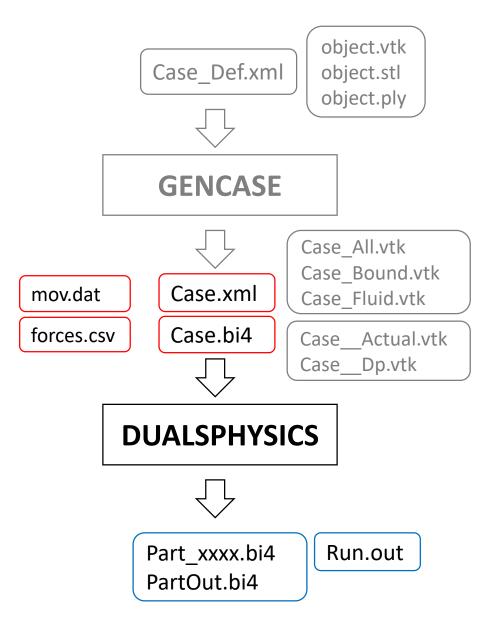
Pre-processing tool: GenCase

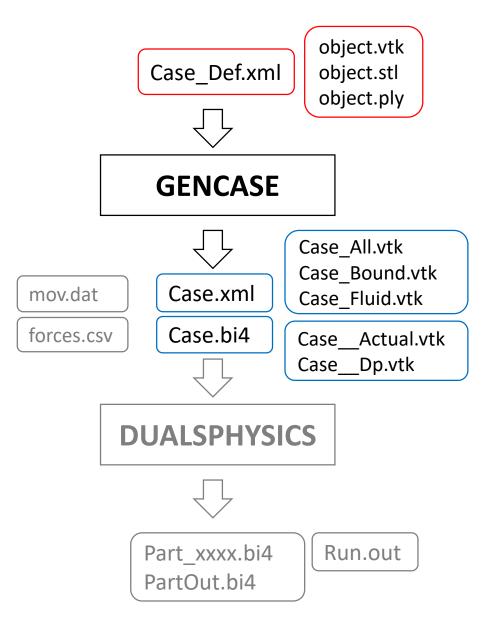
• XML input file

DesignSPHysics

• Future developments







Draw points

- GenCase is a drawing application that creates points that will be converted into particles.
- It employs a **3D lattice to locate points** which represents possible positions of the particles.

Draw points

Lattice

Draw points

Lattice

Drawing triangle

Draw points

Lattice

Drawing triangle \mathbf{N} 000000000000000 \bigcirc 00000000 $\mathbf{D} \mathbf{O}$ 00000000000000 000000 000000 \circ 000000000000 0 0 0()

Draw points

Lattice

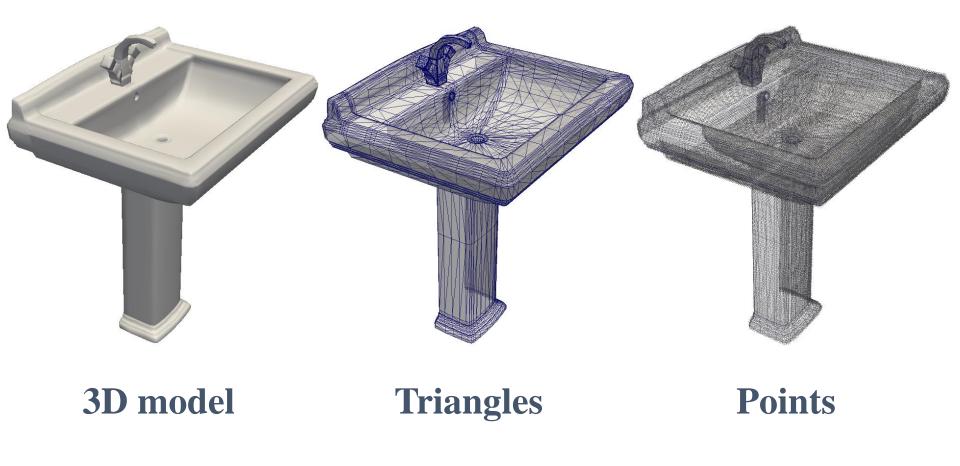
Triangle to points $\bullet \bullet \circ \circ \circ \circ \circ$ 000000000 $\bullet \circ \circ \circ \circ \circ$ 0000000 0 0 0 0 0 0 0 0

Draw points

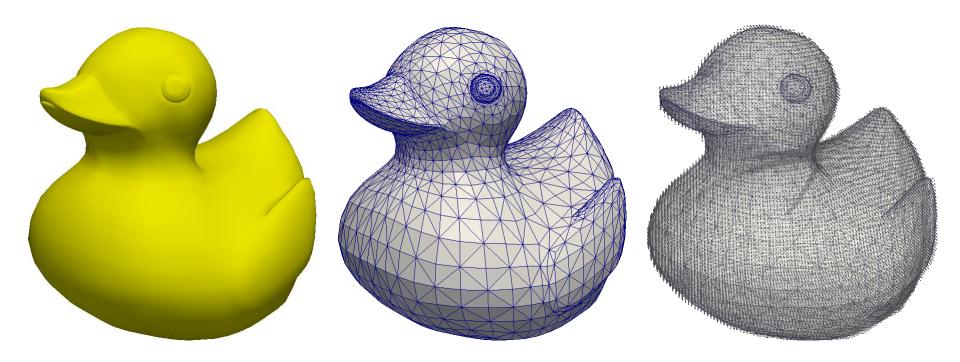


Triangle to points

Draw points



Draw points



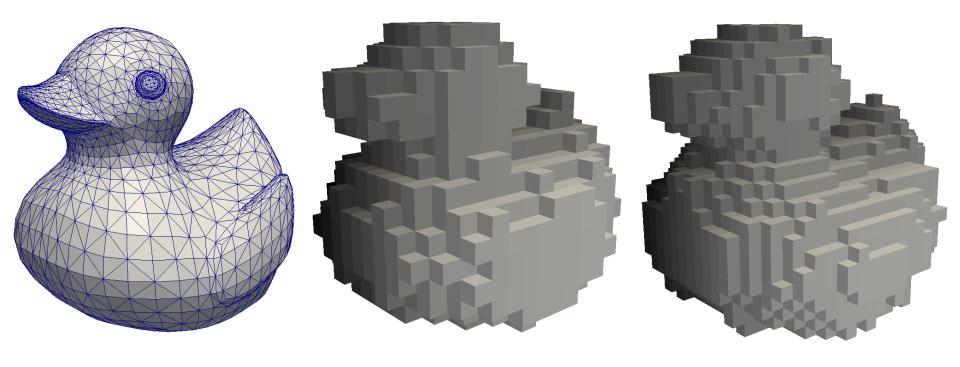
3D model

Triangles

Points

Draw points

Particles are depicted as cubes

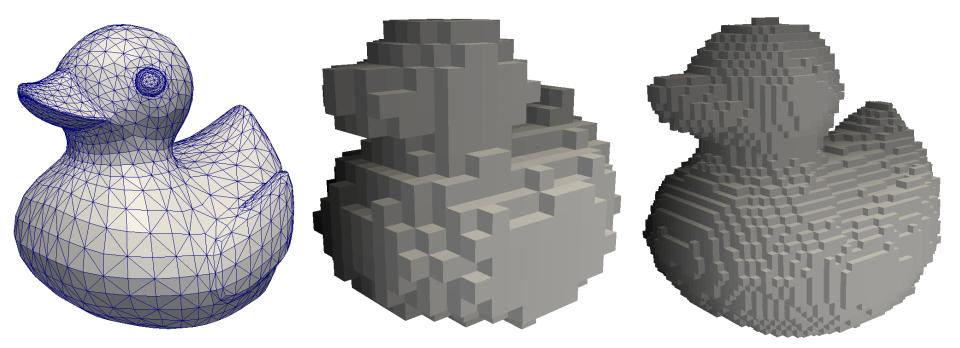




Low resolution 836 particles

Higher resolution 1,836 particles

Draw points

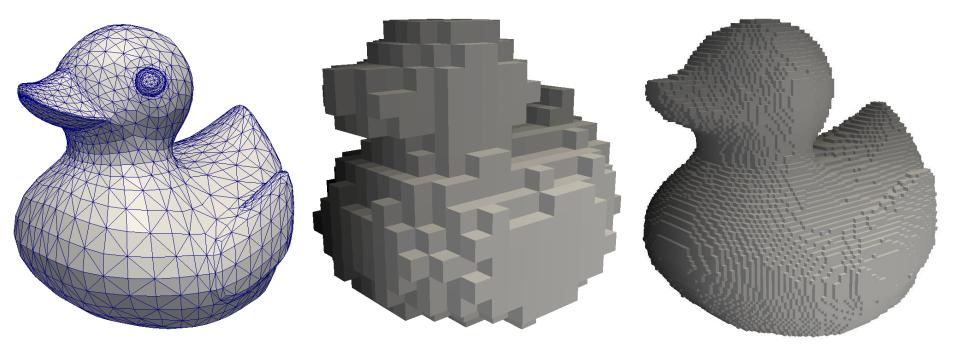




Low resolution 836 particles

Higher resolution 6,934 particles

Draw points



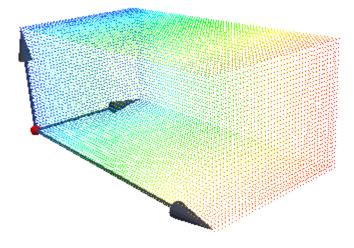


Low resolution 836 particles

Higher resolution 27,474 particles

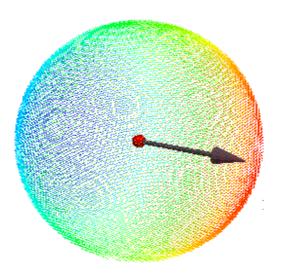
Predefined objects

Predefined shapes can be added to the simulation just by setting up some configuration parameters:



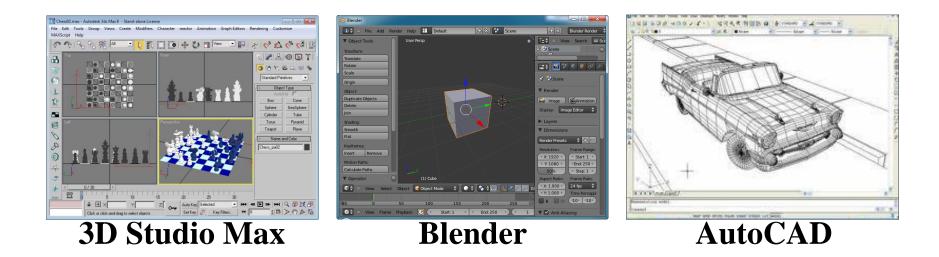
BOX: a **corner** and the **size** are required

SPHERE: the centre and radius are needed



External objects

GenCase is able to load external object designed with different softwares.





External objects

3DS DXF DWG GIS H5PART CSV MAX SHP CAD PLY STL VTK

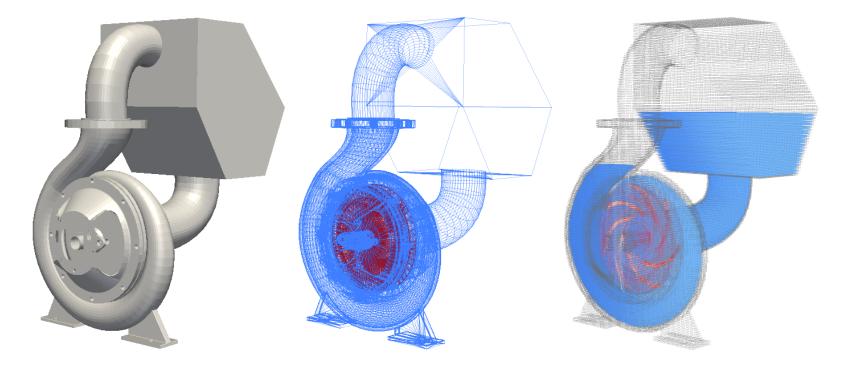


PLY -> exportable using BLENDER STL -> exportable using 3DSTUDIO VTK -> PARAVIEW

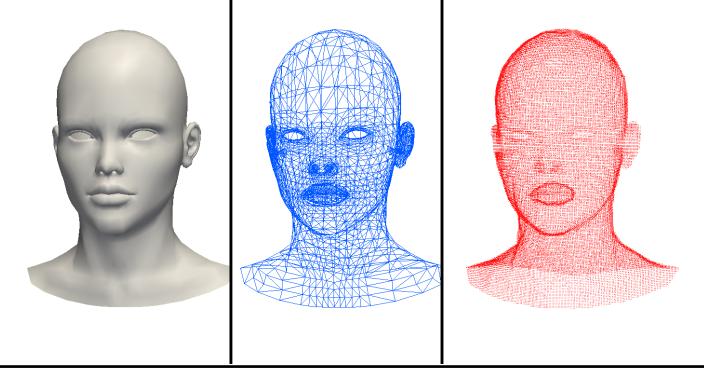


External objects

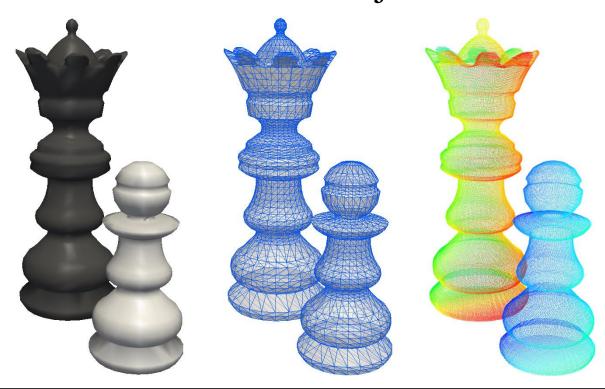
CAD files



External objects 3D Studio objects



External objects 3D Studio objects



Outline of Presentation

Pre-processing tool: GenCase

• XML input file

DesignSPHysics

• Future developments









¢.	case>
	<casedef></casedef>
<case></case>	<constantadef> <lattice bound="1" fluid="1"></lattice> </constantadef>
<pre><debeases< pre=""></debeases<></pre>	<pre><istile bound="1" fluid="1"></istile> /> /> (gravity #="-9.6%" comment="m/s^2" /> /></pre>
<pre><constantsder> <lattice bound="1" fluid="1"></lattice></constantsder></pre>	<pre><cfinumber comment="Coefficient to multiply Dt" value="0.2"></cfinumber></pre>
<pre>cqreaty x="0" y="0" z="-9.61" comment="Gravitational acceleration" units_comment="m/s^2" /></pre>	<pre><hswl auto="true" comment="Maximum still water level to calculate speedofsound using coefsound" units_comment="metres (m)" value="0"></hswl></pre>
<cflnumber comment="Coefficient to multiply Dt" value="0.2"></cflnumber>	<pre><speedsystem auto="true" comment="Maximum system speed (by default the dam-break propagation is used)" value="0"></speedsystem></pre>
<pre><hsvl auto="true" comment="Maximum still water level to calculate speedofsound using coefsound" units_comment="metres (m)" value="0"></hsvl></pre>	<coefsound comment="Coefficient to multiply speedsystem" value="20"></coefsound>
<pre>cspeedsystem value="0" auto="true" comment="Maximum system speed (by default the dam-break propagation is used)" /> cspeedsystem value="0" auto="10" comment="Maximum system speed (by default the dam-break propagation is used)" /> </pre>	<pre>cspeedsound value="0" auto="true" comment="Speed of sound to use in the simulation (by default speedsfound-coefsound*speedsystem)" /> cspeedsound value="1" auto="true" comment="Speed of sound to use in the simulation (by default speedsfound-coefsound*speedsystem)" /> cspeedsound value="1" auto="true" comment="Speed of sound to use in the simulation (by default speedsfound-coefsound*speedsystem)" /> cspeedsound value="1" auto="true" comment="Speed of sound to use in the simulation (by default speedsfound-coefsound*speedsystem)" /> cspeedsound to use the simulation (by default speedsfound-coefsound*speedsystem)" /> cspeedsound to use the simulation (by default speedsfound-coefsound*speedsystem)</pre>
<pre>coefsound value="20" comment="Coefficient to multiply speedsystem" /> capeedsound value="0" auto="true" comment="Speed of sound to use in the simulation (by default speedsfound=coefsound=speedsystem) /> </pre>	<pre><coefn comment="Coefficient to calculate the smoothing length (#=coefficient*sqrt(3*dp*2) in 3D)" value*1.0"=""></coefn> <qummt comment="Politropic constant for water used in the state equation" value*7"=""></qummt></pre>
<pre>coperus/unite="1.0" comment="open of sound to say in the simulation (p) using the spectrometers sound spectrometers and the spe</pre>	<pre>cyanas valee - to comment="Pointopic constant for water used in the state equation // <rhop0 comment="Reference density of the fluid" units_comment="Reference" value="1000"></rhop0></pre>
<gamma comment="Politropic constant for water used in the state equation" value*"7"=""></gamma>	
<rhop0 comment="Reference density of the fluid" units_comment="kg/m3" value="1000"></rhop0>	<pre><mkconfig boundcount="240" fluidcount="10"></mkconfig></pre>
	<geometry></geometry>
<pre>cmkconfig boundcount="240" fluidcount="10" /> cqsconfig boundcount="240" fluidcount="10" /></pre>	<definition dp="0.01" units_comment="metres (m)"></definition>
<pre></pre>	<pre>cpointmin x=-1" y="0" z="-1" /> construction = 0 / (></pre>
<pre><pre>cpointmin x="-1" y="0" z="-1" /></pre></pre>	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>
<pre><pre>cpointmax x="4.5" y="0" z="3.5" /></pre></pre>	<commands></commands>
	<mainlist></mainlist>
<pre><commands> <mailint></mailint></commands></pre>	<setdrawmode mode="full"></setdrawmode>
<pre><stdrawmode mode="full"></stdrawmode></pre>	<setmkfluid mk="0"></setmkfluid>
<pre><setmkfluid mk="0"></setmkfluid></pre>	<drawbox></drawbox>
<drawbox></drawbox>	 barill>solid/boxfill>
<boxfil>solid</boxfil>	<pre>cpint x="0" y="-1" z="0" /> caize x="1" y="2" z="2" /></pre>
<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	
<pre><i cite="" x**1*="" y**2*="" z**2*=""></i> </pre>	<setmkbound mk="0"></setmkbound>
<pre><setmkbound mk="0"></setmkbound></pre>	<drawbox></drawbox>
<dravbox></dravbox>	<boxfill>bottom left right front back</boxfill>
 	<pre><pre>cpoint x="0" y="-1" z="0" /></pre></pre>
<pre>cpoint x="0" y="-1" z="0" /> <cite x="4" y="2" z="3"></cite></pre>	<pre><iize xm<sup="">44 ym¹2* zm¹3* /> </iize></pre>
<pre></pre>	
	<execution></execution>
<pre>cereurs/ <pre>cereurs</pre></pre>	<pre><pre>cparameters></pre></pre>
<pre><pre><pre></pre></pre></pre> <pre><pre><pre><pre><pre><pre><pre><</pre></pre></pre></pre></pre></pre></pre>	<pre>cparameter key="StepAlgorithm' value="1" comment="Step Algorithm 1:Verlet, 2:Symplectic (default=1)" /> cparameter key="VerletStepa" value="40" comment="Verlet only: Number of steps to apply Euler timestepping (default=40)" /></pre>
<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	<pre>cparameter key="Wernel" value="2" comment=" value="2" interaction Kernel 1:Cable Spline, 2:Wendland (default=2)" /></pre>
<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	<pre><pre>cparameter key="ViscoTreatment" value="1" comment="Viscosity formulation 1:Artificial, 2:Laminat-SPS (default=1)" /></pre></pre>
<pre>cparameter key="visco"reatment" value="1" comment="Viscosity formulation liArtificial, 2:Laminar+SPS (default=1)" /> cparameter key="visco" value="0.02" comment="viscosity value" /></pre>	<pre><pre>cparameter key="Visco" value="0.02" comment="Viscosity value" /></pre></pre>
<pre>cyperture(if ky='riso' value' ('riso') value*'' ('riso') value ('riso') valu</pre>	<pre><pre>cparameter key="ViscoBoundFactor" value="1" comment="Hultiply viscosity value with boundary (default=1)" /></pre></pre>
<pre><pre>cparameter key="DeltaSPH" value="0" comment="DeltaSPH value, 0.1 is the typical value, with 0 disabled (default=0)" /></pre></pre>	<pre><pre>cparameter key="DeltaSPH" value="0" comment="DeltaSPH value, 0.1 is the typical value, with 0 disabled (default=0)" /></pre></pre>
<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>	<pre>cparameter key="#Shifting" value="0" comment="Shifting mode 0:None, 1:[gnore hound, 2:[gnore fixed, 3:Full (default=0)" /></pre>
<pre><pre>cparameter key="#ShiftCoef" value="-2" comment="Coefficient for shifting computation (default=-2)" /></pre></pre>	<pre>cparameter key" #shiftSF value=-12 comment= Coefficient for shifting computation (default=2)" // <pre>cparameter key" #shiftSF value=-15" comment="Threshold to detect free surface. Typically 1.5 for 2D and 2.75 for 3D (default=0)" /></pre></pre>
<pre>cparameter key="#ShiftTF5" value="1.5" comment="Threshold to detect free surface. Typically 1.5 for 2D and 2.75 for 3D (default=0)" /> cparameter key="#ShiftTF5" value="1.5" comment="Rigid Algorithm 1:SFN. 2DEM (default=1)" /></pre>	<pre>cparameter key="RigidAlgorithm" value="1" comment="Rigid Algorithm 1:SPE, 2:DEM (default=1)" /></pre>
<pre>cparameter key="Figures/prices" value" = Commenter Anyma Angoriam Figures/Disc (usraula) // cparameter key="Figures" value"="Conference" Time to freeze the floatings at simulation start (warmup) (default=0)" units_comment="seconds" /></pre>	<pre><pre>cparameter key="FtPause" value="0.0" comment="Time to freeze the floatings at simulation start (warmup) (default=0)" units comment="seconds" /></pre></pre>
<pre><pre>coefDtHin" value="0.05" comment="Coefficient to calculate minimum time step dtmin=coefdtemin*h/speedsound (default=0.05)" /></pre></pre>	<pre><pre>coefDtMin" value="0.05" comment="Coefficient to calculate minimum time step dtmin=coefdtemin*h/speedsound (default=0.05)" /></pre></pre>
<pre><pre><pre>cparameter key="#DtIni" value="0.0001" comment="Initial time step (default=h/speedsound" units_comment="seconds" /></pre></pre></pre>	<pre><pre><pre>cparameter key="#DtIni" value="0.0001" comment="Initial time step (default=h/speedsound" units_comment="seconds" /></pre></pre></pre>
<pre><pre>cparameter key="#DtMin" value="0.00001" comment="Minimum time step (default=coefdtmin*h/speedsound)" units_comment="seconds" /></pre></pre>	<pre><pre><pre>cparameter key="#DtMin" value="0.00001" comment="Minimum time step (default=coefdtmin*h/speedsound)" units_comment="seconds" /></pre></pre></pre>
<pre>cparameter key="#0Fixed" value="Dfixed.dat" comment="Dt values are loaded from file (default-disabled)" /> cparameter key="Dtlixed" value="Dt under=""velocity of particles used to calculate DT. ixil, D ::Dividy fluid/floating (default=0)" /> </pre>	<pre>cparameter key="#DtFixed" values"DtFixed.dst" comment="Dt values are loaded from file (default-disabled)" /></pre>
<pre>cparameter key="balancest key="balancest" comment="velocity or parameter key="balancest key</pre>	<pre>cparameter key="Updalrationes" value="0" comment="velocity of particles used to calculate UT. 1:AIL, USUNIY fluid/floating (default=0)" /> <pre>cparameter key="lisedkay" value="0.2" comment="velocity of particles used to calculate UT. 1:AIL, USUNIY fluid/floating (default=0)" /> <pre>cparameter key="lisedkay" value="0.2" comment="velocity of particles used to calculate UT. 1:AIL, USUNIY fluid/floating (default=0)" /> </pre></pre></pre>
<pre><pre>cparameter key="fimeOut" value="0.01" comment="fime out data" unit_comment="seconds" /></pre></pre>	<pre>cparameter key="fimeOut" value="0.01" comment="fime out data" units_comment="seconds" /></pre>
<pre><pre>cparameter key="IncZ" value="1" comment="Increase of Z+" units_comment="decimal" /></pre></pre>	<pre>cparameter key="IndZ" value="1" comment="Increase of Z+" units comment="decimal" /></pre>
<pre><pre><pre><pre>cparameter key="PartsOutMax" value="1" comment="Allowed %/100 of fluid particles out the domain (default=1)" units_comment="decimal" /></pre></pre></pre></pre>	<pre><pre>cparameter key="PartsOutMax" value="1" comment="Allowed %/100 of fluid particles out the domain (default=1)" units_comment="decimal" /></pre></pre>
<pre><pre>cparameter key="RhopOutMin" value="700" comment="Minimum rhop valid (default=700)" units_comment="kg/m3" /></pre></pre>	<pre><pre>cparameter key="RhopOutMin" value="700" comment="Minimum rhop valid (default=700)" units_comment="kg/m3" /></pre></pre>
<pre>cparameter key="RhopOutMax" value="1300" comment="Haximum rhop valid (default=1300)" units_comment="kg/m3" /> </pre>	<pre><parameter comment="Maximum rhop valid (default=1300)" key="RhopOutMax" units_comment="kg/m3" value="1300"></parameter></pre>
v/parameters/ v/parameters/	
	<pre>cparticles np=21001 nb="1001" mkfoundfirse="11" mkfoundfirse="1"></pre>
	<fluid begin="1001" count="20000" mt="1" mtfluid="0"></fluid>
	<constants></constants>
	<gravity units_comment="m/s^2" x="0" y="0" z="-9.81"></gravity>
	<cflnumber value="0.2"></cflnumber>
	<ganma value="7"></ganma>
	<pre>crhop value*1000" units_comment="kg/ma" /> <dp units_comment="mattem (m) " value*0.01"=""></dp> </pre>
	<hr/>
	<pre><b units_comment="metres (m) " value='1.1153371498+006"'></pre>
	<pre>cmassbound value="1.0000000008-001" units_comment="kg" /></pre>
	<pre><massfluid units_comment="kg" value="1.0000000000E-001"></massfluid></pre>
	<pre>(motion /></pre>

STRUCTURE OF THE XML FILE

http://dual.sphysics.org/index.php/downloads/

- DUALSPHYSICS DOCUMENTATION:
 - $\circ \ \ DualSPHysics_v4.0_GUIDE.pdf$
 - oXML_GUIDE_v4.0.pdf
 - ExternalModelsConversion_GUIDE.pdf
 - PostprocessingCalculations.pdf
- DUALSPHYSICS PACKAGE:
 - o DualSPHysics_v4.0_Linux_x64.zip
 - o DualSPHysics_v4.0_Windows_x64.zip

STRUCTURE OF THE XML FILE

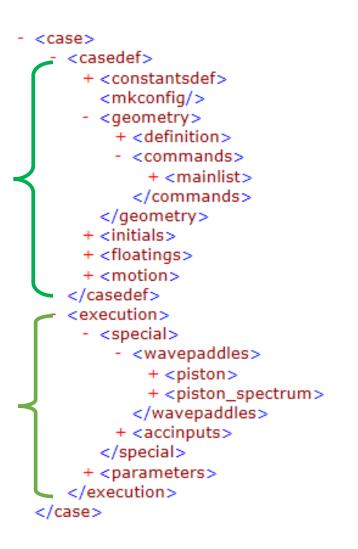
Divided in two sections:

"casedef"

Definition of the case with initial geometry and configuration. Created by the user and used by GenCase

"execution"

Information required to execute the case. Created by the user, modified by GenCase and only used by DualSPHysics



STRUCTURE OF THE XML FILE

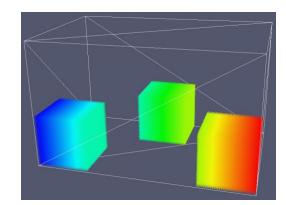
- "casedef" :
- constantsdef constants needed in SPH
- mkconfig label configuration
- geometry system geometry (boundaries and fluid)
 - definition
 - commands (list & mainlist)
- initials special features for fluid particles
- floatings description of floating objects
- motion description of boundary movement
- "execution"
- **special** automatic wave generation and external forces
 - wavepaddles (piston & piston_spectrum)
 - accinputs
- parameters execution parameters in DualSPHysics

CASEDEF-CONSTANTSDEF

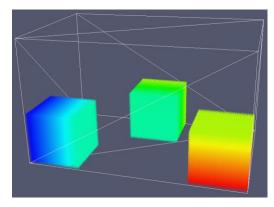
```
<constantsdef>
    <lattice bound="1" fluid="1" />
    <gravity x="0" y="0" z="-9.81" comment="Gravitational acceleration"</pre>
                                units comment="m/s^2" />
    <rhop0 value="1000" comment="Reference density of the fluid"
                                 units comment="kg/m^3" />
    <hswl value="0" auto="true" comment="Maximum still water level to calculate speedofsound"</pre>
                                 units comment="metres (m)" />
    <gamma value="7" comment="Polytropic constant for water used in the state equation" />
    <speedsystem value="0" auto="true" comment="Maximum system speed</pre>
                                 (by default the dam-break propagation is used) " />
    <coefsound value="20" comment="Coefficient to multiply speedsystem" />
    <speedsound value="0" auto="true" comment="Speed of sound to use in the simulation</pre>
                                 (by default speedofsound=coefsound*speedsystem) " />
    <coefh value="0.866025" comment="Coefficient to calculate the smoothing length
                                 (h=coefh*sqrt(3*dp^2) in 3D) " />
    <cflnumber value="0.2" comment="Coefficient to multiply dt" />
</constantsdef>
```

CASEDEF-MKCONFIG

mkorientfluid = "xyz"



mkorientfluid = "xyz" mkorientfluid = "yzX" mkorientfluid = "ZYx"



mk: label used to

- defines the order objects are created
- applies specific features to the different set of points such as movement, rigid motion...

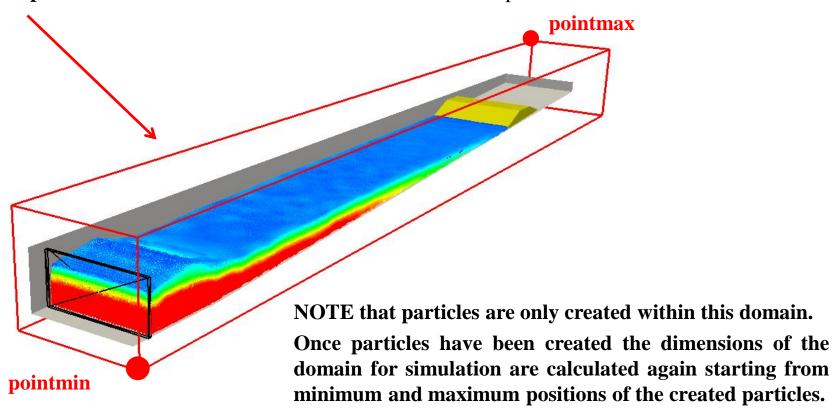
240 labels for boundary particles and 10 labels for fluid particles

mkorientation: determines the order of particles when creating one object (useful for visualization with the variable *idp*)

CASEDEF-GEOMETRY-DEFINITION

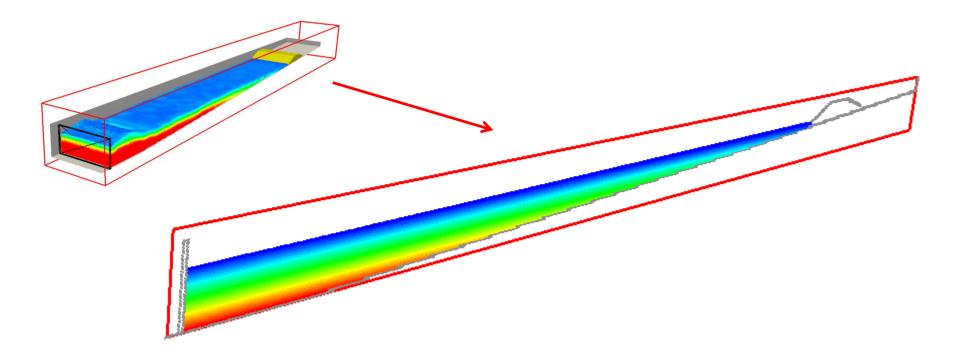
dp defines the distance between particles

WHEN CHANGING THIS PARAMETER, THE TOTAL NUMBER OF PARTICLES IS MODIFIED pointmin & pointmax defines the dimensions of the domain where particles can be created



CASEDEF-GEOMETRY-DEFINITION

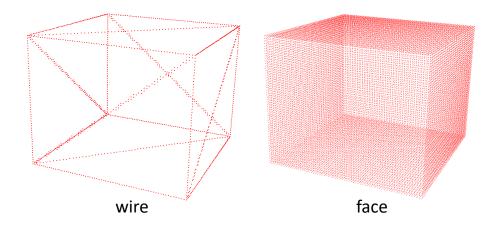
A 2-D configuration can be generated by imposing the same values along Y-direction cpointmin> = <pointmax>



This command indicates the mode to create points where particles will be generated

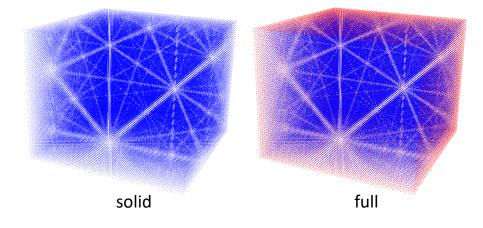
- <mainlist>

<setdrawmode mode="wire"/> <setdrawmode mode="face"/> <setdrawmode mode="solid"/> <setdrawmode mode="full"/> </mainlist>



<setdrawmode>:

- "wire": wire mode
- "face": draw faces
- "solid": draw inside
- "full": combines *face* and *solid*



<setmkbound mk="0"/> <drawfilestl file="File.stl"/> <drawfileply file="File.ply"/> <drawfileply file="File.vtk"/> - <drawfilestl file="File.stl"> <drawmove x="0.5" v="0" z="0"/> <drawrotate angx="10" angy="15" angz="30"/> <drawscale x="1" v="1" z="0.8"/> </drawfilestl> - <drawfileply file="File.ply"> <drawmove x="0.5" y="0" z="0"/> </drawfileply> - <drawfileply file="File.ply"> <drawmove x="0.5" y="0" z="0"/> <drawrotate angx="10" angy="15" angz="30"/> </drawfileply> - <drawfileply file="File.ply"> <drawrotate angx="10" angy="15" angz="30"/> </drawfileply> - <drawfilevtk file="File.vtk"> <polyselec>points</polyselec> </drawfilevtk> - <drawfilevtk file="File.vtk"> <polyselec>points | lines</polyselec> </drawfilevtk> - <drawfilevtk file="File.vtk"> <polyselec>triangles</polyselec> </drawfilevtk> - <drawfilevtk file="File.vtk"> <polyselec>polygons</polyselec> </drawfilevtk> </mainlist>

- <mainlist>

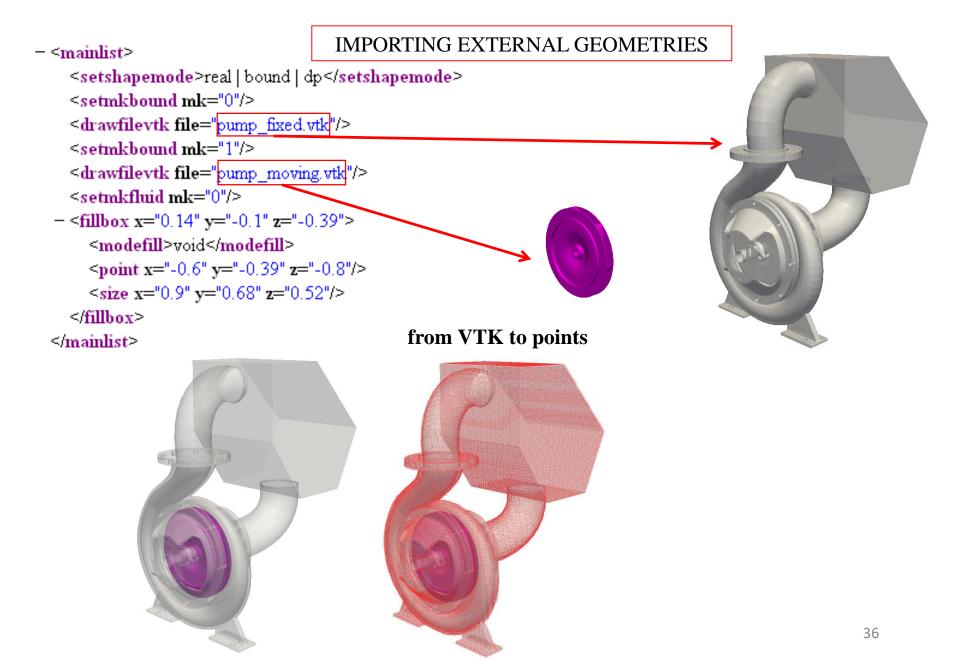
IMPORTING EXTERNAL GEOMETRIES

<drawfilevtk>: load a VTK file to be converted into points

<drawfileply>: load a PLY file to be converted into points

<drawfilestl>: load a STL file to be converted into points

Some modifications can be applied to the VTK, PLY or STL **drawmove** a displacement is applied to the external object **drawrotate** a rotation is applied to the external object **drawscale** scaling is applied to the external object



```
- <mainlist>
    <setmkfluid mk="0"/>
    <fillvoidpoint x="3" y="2" z="1"/>
  - <fillpoint x="3" y="2" z="1">
       <modefill>void</modefill>
    </fillpoint>
  - <fillpoint x="1" y="1" z="1" mkfluid="0">
       <modefill>fluid</modefill>
    </fillpoint>
  - <fillpoint x="1" y="1" z="1" mkbound="0">
       <modefill>bound</modefill>
    </fillpoint>
  - <fillpoint x="2" y="2" z="2" mkfluid="2" mkbound="8">
       <modefill>border | void | fluid | bound</modefill>
    </fillpoint>
  - < fillbox x = 0" v = 1" z = 0">
       <modefill>border</modefill>
      <point x="0.1" y="1" z="1.1"/>
      <size x="3" v="4" z="2"/>
    </fillbox>
  - <fillprism x="2" y="3" z="5">
       <point x="0" y="0" z="0"/>
      <point x="1" y="0" z="0"/>
      <point x="0" y="1" z="0"/>
      <point x="0" y="0" z="0.5"/>
      >point x="1" y="0" z="0.5"/>
       <point x="0" y="1" z="0.5"/>
       <modefill>void</modefill>
    </fillprism>
    <debugout/>
 </mainlist>
```

FILLING DOMAINS

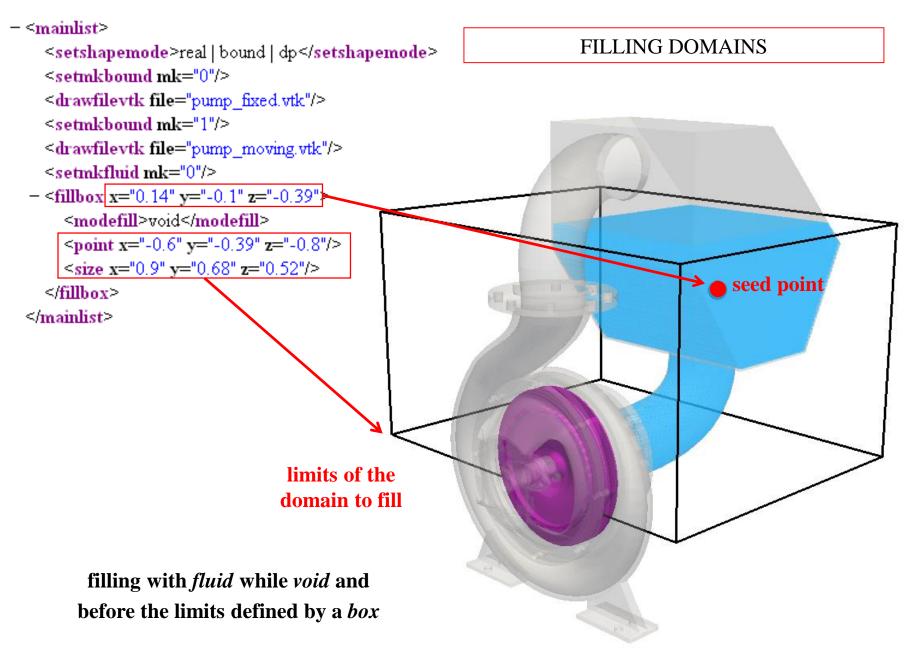
<fillpoint>: fills with points starting from the seed

<**fillbox>:** fills with points starting from the seed within the limits defined by a box

<**fillfigure>:** fills with points starting from the seed within the limits defined by a figure

<**fillprism>:** fills with points starting from the seed within the limits defined by a prism

<modefill> indicates what type of points can be filled with *void*, *fluid*, *bound*, it fills with that type of points inside the specified limits or the presence of a given type of point using *border*



CASEDEF-FLOATINGS

- <floatings>
 - <floating mkbound="0" relativeweight="1.3"/>
 - <floating mkbound="1" relativeweight="1.3">
 <velini x="1" y="3" z="2"/>
 <omegaini x="0.2" y="0.4" z="0.6"/>
 <floating>
 - <floating mkbound="2">
 <massbody value="1300"/>
 <center x="11" y="12" z="13"/>
 <inertia x="20" y="22" z="24"/>

</floating>

- <floating mkbound="3">
 <massbody value="1300"/>
 <center x="11" y="12" z="13"/>
 <inertia x="20" y="22" z="24"/>
 <velini x="1" y="3" z="2"/>
 <omegaini x="0.2" y="0.4" z="0.6"/>
 </floating>

DEFINING FLOATINGS

<**floatings>:** indicates that a set of particles labelled with the same *mk* constitutes a floating object

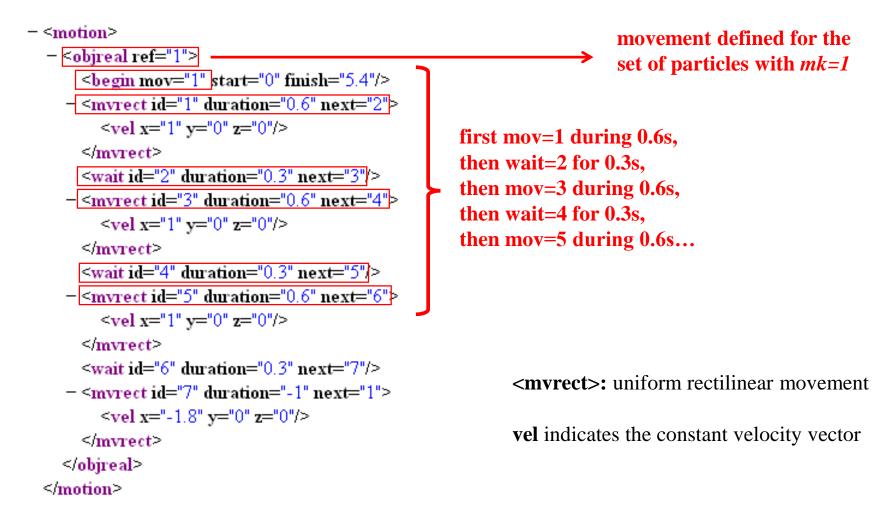
Only one of these values can be defined: rhopbody density of the object relativeweight in relation to the reference density massbody total mass of the object

So that, the mass of a floating particles is: **masspart** = massbody / nfloat **or masspart** = relativeweight * rhop0 * dp^3 **or masspart** = rhopbody * dp^3

These variables are computed by GenCase or can be also specified in advance: **center** gravity center of the rigid object **inertia** momentum of inertia of the rigid object **velini** initial linear velocity of the object **omegaini** initial angular velocity of the object

CASEDEF-MOTION

•*Motion01*: uniform rectilinear motion (**<mvrect** /**>**) that also includes pauses (**<wait** /**>**)



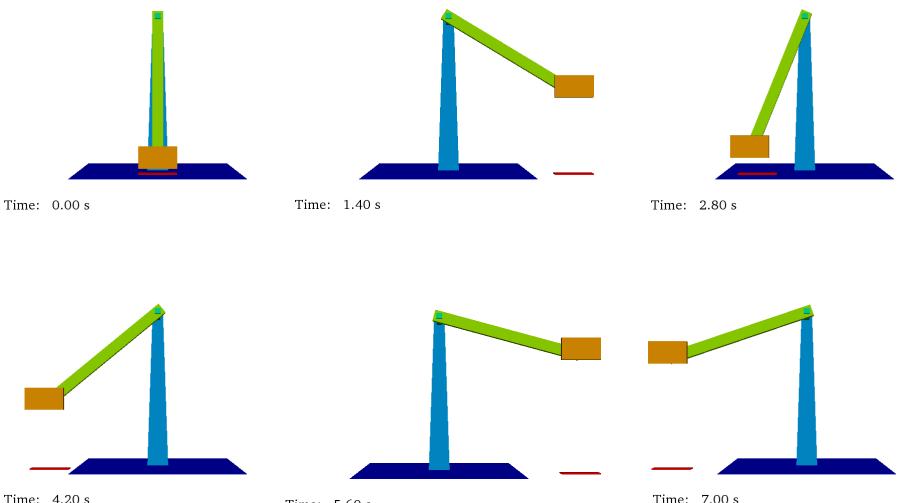
CASEDEF-MOTION

•*Motion07*: sinusoidal movement (**<mvrectsinu** /**>**, **<mvrotsinu** /**>**, **<mvcirsinu** /**>**)

```
- <motion>
  - <objreal ref="4">
      <br/>
<br/>
begin mov="1" start="0"/>
                                                                                           <mvrectsinu>: sinusoidal rectilinear
                                               - <mvcirsinu id="2" duration="5" next="1">
    = <mvrotsinu id="1" duration="5" next="2">
                                                   <ref x="0" y="-0.7" z="0.2"/>
                                                                                           movement
        <axisp1 x="0" y="0" z="2.85"/>
                                                   <axisp1 x="0" y="0" z="2.85"/>
        <axisp2 x="0" y="1" z="2.85"/>
                                                   <axisp2 x="0" y="1" z="2.85"/>
        <freq v="0.2"/>
                                                                                           <mvrotsinu>: sinusoidal rotational
                                                   <freq v="0.4"/>
        <ampl v="60"/>
                                                   <ampl v="75"/>
                                                                                           movement
        < phase v="0"/>
                                                   <phase v="0"/>
      </mvrotsinu>
                                                 </mvcirsinu>
    - <mvrotsinu id="2" duration="5" next="1">
                                                                                           <mvcirsinu>: sinusoidal circular
                                               </objreal>
        <axisp1 x="0" y="0" z="2.85"/>
                                              - <objreal ref="6">
                                                                                           movement
        <axisp2 x="0" y="1" z="2.85"/>
                                                  <begin mov="1" start="0"/>
        <freq v="0.4"/>
                                                - <mvrectsinu id="1" duration="5" next="2">
        <ampl v="75"/>
                                                    <freq x="0.2" y="0" z="0"/>
                                                                                            axisp1 first point of the rotation axis
      </mvrotsinu>
                                                    <ampl x="2.30" y="0" z="0"/>
                                                                                             axisp2 second point of the axis
   </obireal>
                                                    hase x="0" y="0" z="0"/>
                                                                                            freq frequency
  - <objreal ref="5">
                                                  </mvrectsinu>
      <br/>
start="0"/>
                                                - <mvrectsinu id="2" duration="5" next="1">
                                                                                             ampl amplitude
    - <mvcirsinu id="1" duration="5" next="2"</p>
                                                    <freq x="0.4" y="0" z="0"/>
                                                                                            phase phase
        <ref x="0" y="-0.7" z="0.2"/>
                                                    <ampl x="2.55" y="0" z="0"/>
        <axisp1 x="0" y="0" z="2.85"/>
                                                    hase x="0" y="0" z="0"/>
        <axisp2 x="0" y="1" z="2.85"/>
                                                  </mvrectsinu>
        <freq v="0.2"/>
                                                </objreal>
        <ampl v="60"/>
                                              </motion>
        <phase v="0"/>
      </mvcirsinu>
```

CASEDEF-MOTION

•*Motion07*: sinusoidal movement (**<mvrectsinu** /**>**, **<mvrotsinu** /**>**, **<mvcirsinu** /**>**)





Time: 7.00 s

CASEDEF-MOTION

•*Motion08*: predefined movement with data from an external file (**<mvpredef** /**>** or **<mvfile** /**>**)

```
- <motion>
  - <objreal ref="200">
      <br/>
start="0"/>
    - <mvpredef id="1" duration="10">
        <file name="motion08mov_f3.out" fields="4" fieldtime="0" fieldx="1" fieldy="2" fieldz="3"/>
      </mvpredef>
   </objreal>
                                                                                    <mvpredef /> or <mvfile />:
  - <objreal ref="150">
      <begin mov="1" start="0"/>
                                                                                    prescribed motion loaded from a file
    - <mvpredef id="1" duration="8" next="2">
        <file name="motion08mov_f3.out" fields="4" fieldtime="0" fieldx="1" fieldy="2"/>
                                                                                    name name of the file
      </mvpredef>
    - <mvrect id="2" duration="-1">
                                                                                    fields number of columns of the file
        <vel x="0" y="0" z="-0.02"/>
                                                                                    fieldtime column with time
      </mvrect>
                                                                                    fieldx column with X-position
   </objreal>
                                                                                    fieldy column with Y-position
  - <objreal ref="151">
      <begin mov="1" start="0"/>
                                                                                    filedz column with Z-position
    - <mvpredef id="1" duration="10">
        <file name="motion08mov_f3.out" fields="4" fieldtime="0" fieldx="1" fieldz="3"/>
      </mvpredef>
   </objreal>
                                                                             first field (or column) has reference "0"
  - <objreal ref="152">
                                                                             second field (or column) has reference "1"
      <begin mov="1" start="0"/>
    - <mvpredef id="1" duration="10">
        <file name="motion08mov_f3.out" fields="4" fieldtime="0" fieldy="2" fieldz="3"/>
      </mvpredef>
   </objreal>
 </motion>
```

CASEDEF-MOTION

•*Motion09*: predefined movement with data from an external file (**<mvrotfile** /**>**)

<mvrotfile />: prescribed motion loaded from a file with degrees

name name of the file
axisp1 & axisp2 two points to define the axis of rotation

```
<motion>

<motion>

<dbjreal ref="1">

<begin mov="1" start="0" finish="100" />

<mvrotfile id="1" duration="9" next="2" anglesunits="degrees">

<file name="Motion09mov_deg.csv" />
<axisp1 x="1" y="1" z="0.03" />
<axisp2 x="1" y="-1" z="0.03" />
</mvrotfile>

// 
// 

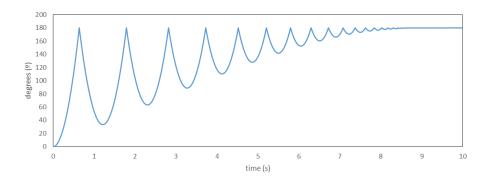
// 

// 

// 

<pre
```





XML file EXECUTION-SPECIAL-WAVEPADDLES-PISTON

Generation of regular waves

<piston>

```
<mkbound value="10" comment="Mk-Bound of selected particles" />
<waveorder value="2" comment="Order wave generation 1:1st order, 2:2nd order (def=1)" />
<start value="0" comment="Start time (def=0)" />
<duration value="0" comment="Movement duration, Zero is the end of simulation (def=0)" />
<depth value="0.27" comment="Fluid depth (def=0)" />
<fixeddepth value="0" comment="Fluid depth without paddle (def=0)" />
<fixeddepth value="0" comment="Wave ment direction (def=(1,0,0))" />
<pistondir x="1" y="0" z="0" comment="Wave height" />
<waveheight value="0.1" comment="Wave period" />
square value="0" comment="Initial wave phase in function of PI (def=0)" />

<ramp value="0" comment="Periods of ramp (def=0)" />

<savemotion periods="24" periodsteps="20" xpos="-0.15"</p>
```

•*waveorder*: order of wave generation (1st order or 2nd order)

•*depth*: depth at front of the piston

•waveheight: wave height H

•*waveperiod*: wave period T

•*ramp*: number of periods to smooth the movement of the piston

•savemotion: saves theoretical results of elevation and orbital velocities at xpos and zpos

(being zpos=-depth of the measuring point)

EXECUTION-SPECIAL-WAVEPADDLES-PISTON_SPECTRUM

Generation of irregular waves

```
<piston spectrum>
    <mkbound value="10" comment="Mk-Bound of selected particles" />
    <waveorder value="2" comment="Order wave generation 1:1st order, 2:2nd order (def=1)" />
    <start value="0" comment="Start time (def=0)" />
    <duration value="0" comment="Movement duration, Zero is the end of simulation (def=0)" />
    <depth value="0.27" comment="Fluid depth (def=0)" />
    <fixeddepth value="0" comment="Fluid depth without paddle (def=0)" />
    <pistondir x="1" y="0" z="0" comment="Movement direction (def=(1,0,0))" />
    <spectrum value="jonswap" comment="Spectrum type: jonswap,pierson-moskowitz" />
    <discretization value="stretched"</pre>
                comment="Spectrum discretization: regular, random, stretched, cosstretched (def=stretched)" />
    <waveheight value="0.1" comment="Wave height" />
    <waveperiod value="1.3" comment="Wave period" />
    <peakcoef value="3.3" comment="Peak enhancement coefficient (def=3.3)" />
    <waves value="128" comment="Number of waves to create irregular waves (def=50)" />
    <randomseed value="2" comment="Random seed to initialize a pseudorandom number generator" />
    <serieini value="2.8" comment="Initial time in irregular wave serie (def=0)" />
    <ramptime value="1" comment="Time of ramp (def=0)" />
    <savemotion time="50" timedt="0.05" xpos="2" zpos="-0.15"</pre>
                comment="Saves motion data. xpos and zpos are optional. zpos=-depth" />
    <saveserie timemin="0" timemax="1300" timedt="0.05" xpos="0" comment="Saves serie data (optional)" />
    <saveseriewaves timemin="0" timemax="1000" xpos="2" comment="Saves serie heights" />
</piston spectrum>
```

EXECUTION-PARAMETERS

Parameters for execution in DualSPHysics

<parameters>

<parameter comment="Precision in particle interaction 0:Simple, 1:Double, 2:Uses and saves double (default=0)" key="PosDouble" value="1"></parameter>
<parameter comment="Step Algorithm 1:Verlet, 2:Symplectic (default=1)" key="StepAlgorithm" value="1"></parameter>
<parameter comment="Verlet only: Number of steps to apply Euler timestepping (default=40)" key="VerletSteps" value="40"></parameter>
<parameter comment="Interaction Kernel 1:Cubic Spline, 2:Wendland (default=2)" key="Kernel" value="1"></parameter>
<parameter comment="Viscosity formulation 1:Artificial, 2:Laminar+SPS (default=1)" key="ViscoTreatment" value="1"></parameter>
<pre><parameter comment="Viscosity value" key="Visco" value="0.1"></parameter></pre>
<parameter comment="Multiply viscosity value with boundary (default=1)" key="ViscoBoundFactor" value="1"></parameter>
<parameter comment="DeltaSPH value, 0.1 is the typical value, with 0 disabled (default=0)" key="DeltaSPH" value="0"></parameter>
<parameter comment="Shifting mode 0:None, 1:Ignore bound, 2:Ignore fixed, 3:Full (default=0)" key="#Shifting" value="0"></parameter>
<parameter comment="Coefficient for shifting computation (default=-2)" key="#ShiftCoef" value="-2"></parameter>
<parameter comment="Threshold to detect free surface. Typically 1.5 for 2D and 2.75 for 3D (default=0)" key="#ShiftTFS" value="1.5"></parameter>
<parameter comment="Rigid Algorithm 1:SPH, 2:DEM (default=1)" key="RigidAlgorithm" value="1"></parameter>
<parameter comment="Time to freeze the floatings at simulation start (warmup) (default=0)" key="FtPause" units_comment="seconds" value="0.0"></parameter>
<parameter comment="Coefficient to calculate minimum time step dtmin=coefdtmin*h/speedsound (default=0.05)" key="CoefDtMin" value="0.05"></parameter>
<pre><parameter comment="Initial time step (default=h/speedsound)" key="#DtIni" units_comment="seconds" value="0.0001"></parameter></pre>
<pre><parameter comment="Minimum time step (default=coefdtmin*h/speedsound)" key="#DtMin" units_comment="seconds" value="0.00001"></parameter></pre>
<pre><parameter comment="Dt values are loaded from file (default=disabled)" key="#DtFixed" value="DtFixed.dat"></parameter></pre>
<pre><parameter comment="Velocity of particles used to calculate DT. 1:All, 0:Only fluid/floating (default=0)" key="DtAllParticles" value="0"></parameter></pre>
<pre><parameter comment="seconds" key="TimeMax" units="" value="1.5"></parameter></pre>
<pre><parameter comment="Time out data" key="TimeOut" units_comment="seconds" value="0.01"></parameter></pre>
<pre><parameter comment="decimal" key="IncZ" units="" value="1"></parameter></pre>
<pre><parameter comment="Allowed %/100 of fluid particles out the domain (default=1)" key="PartsOutMax" units_comment="decimal" value="1"></parameter></pre>
<pre><parameter comment="kg/m^3" key="RhopOutMin" units="" value="700"></parameter></pre>
<pre><parameter comment="kg/m^3" key="RhopOutMax" units="" value="1300"></parameter></pre>
/parameters>







(c)	ase>				
	<casedet></casedet>				
ccase>	<pre><constantsdef> <latice bound="1" fluid="1"></latice></constantsdef></pre>				
<pre><casedef> </casedef></pre>	<pre><cature """"""""""""""""""""""""""""""""""<="" 1="" bound="" file="-" td=""></cature></pre>				
<pre><lattice bound="1" fluid="1"></lattice></pre>	<cflumber comment="Coefficient to multiply Dt" value="0.2"></cflumber>				
<gravity comment="Gravitational acceleration" units_comment="m/s^2" x="0" y="0" z="-9.81"></gravity>	<pre><hswl auto="true" comment="Maximum still water level to calculate speedofsound using coefsound" units_comment="metres (m)" value="0"></hswl></pre>				
<pre><ofinumber 0"="" atto="true" auto="true" comment="Maximum system speed (by default the dam-break propagation is used)" units="" value="0.2"></ofinumber> <greensestem.value="0")<="" auto="finite" comment="Maximum system speed (by default the dam-break propagation" pre=""></greensestem.value="0"></pre>					
<pre>cnsw1 value="0" auto="true" comment="wakimus still water level to calculate speedorsound using coefficience"="https://waters.org/// cspeedorsound using coefficience"</pre>	<pre>cccefsound value="20" comment="Coefficient to multiply speedaystem" /> cspeedaound value="20" comment="Speed of sound to use in the simulation (by default speedofsound=coefsound=speedaystem)" /></pre>				
<pre><coefsound comment="Coefficient to multiply speedsystem" value="20"></coefsound></pre>	<pre>copeduation = full = 0 after = true = provide of source of a source on the simulation of the provide source = provide so</pre>				
<pre><speedsound auto="true" comment="Speed of sound to use in the simulation (by default speedofsound=coefsound*speedsystem)" value="0"></speedsound></pre>	<pre><qamma comment="Politropic constant for water used in the state equation" value="7"></qamma></pre>				
<pre><coefh comment="Coefficient to calculate the smoothing length (H=coefficient*sqrt(3*dp*2) in 3D)" value="1.0"></coefh></pre>	<rhop0 comment="Reference density of the fluid" units_comment="kg/m3" value="1000"></rhop0>				
<pre>cquarma value*"7" comments"Folitropic constant for water used in the state equation" /> crhop value*"100" comments"*Reference density of the fluid" units_comments"kg/ma" /> </pre>					
<pre></pre>	<pre>cmkconfig boundount="240" fluidount="10" /> cgecmetry></pre>				
<mkconfig boundcount="240" fluidcount="10"></mkconfig>	<pre><definition dp="0.01" units_comment="metres (m)"></definition></pre>				
<geometry></geometry>	<pre><pre>cpointmin x="-1" y="0" z="-1" /></pre></pre>				
<definition dp="0.01" units_comment="metres (m)"> <pointmin x="-1" y="0" z="-1"></pointmin></definition>	<pre><pre>cpointmax x="4.5" y="0" z="3.5" /></pre></pre>				
<pre>cpointean x = x - y = 0 = z - x - /> cpointean x = x = x = 3.5 * /> </pre>					
	<pre><commands> </commands></pre> <mainlet></mainlet>				
<commands></commands>	<pre><destate of="" se<="" second="" td="" the=""></destate></pre>				
<pre>(mainlet> </pre> <pre>(action and action and action and action action</pre>	<setmkfluid mk="0"></setmkfluid>				
<pre><actualmost full="" mode"=""></actualmost> <actualmost full="" mode"=""></actualmost> <actualmost full="" mode"=""></actualmost></pre>	<drawbox></drawbox>				
<dravbox></dravbox>	<boxfill>solid</boxfill>				
<boxfill>solid</boxfill>	<pre>cpoint x="0" y="-1" z="0" /></pre>				
<pre><pre>cpoint x="0" y="-1" z="0" /></pre></pre>	<pre><iic ***1*="" y**2*="" z**2*=""></iic> </pre>				
<pre></pre>					
<pre></pre>	<pre></pre> drawbox>				
<dravbox></dravbox>	<boxfill>bottom left right front back</boxfill>				
<pre><boxfill>bottom left right front back</boxfill></pre>	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>				
<pre><pre>cpoint x="0" y=-1" z="0" /></pre></pre>	<aize x="4" y="2" z="3"></aize>				
<pre><dize x="4" y="2" z="3"></dize> </pre>					
<execution></execution>	<execution></execution>				
	<pre>cparameters></pre>				
<pre><pre>cyarameter key="StepAlgorithm" value="1" comment="Step Algorithm 1:Verlet, 2:Symplectic (default=1)" /></pre></pre>	<pre><pre>cparameter key= Subplayortium value = r Comment= Subp Algortium rveriet, risymplectic (default=1) // // // // // // // // // // // // //</pre></pre>				
<pre><pre><pre><cpre>ameter key="VerletSteps" value="40" comment="Verlet only: Number of steps to apply Euler timestepping (default=40)" /></cpre></pre></pre></pre>	<pre>cparameter key="Kernel" value="2" comment="Interaction Kernel 1:Cubic Spline, 2:Wendland (default=2)" /></pre>				
<pre><pre>starter key="Kornel" value="2" comment="Interaction Kornel 1:Cubic Spline, 2:Wendland (default=2)" /></pre></pre>	<pre><parameter comment="Viscosity formulation 1:Artificial, 2:Laminar+SPS (default=1)" key="ViscoTreatment" value="1"></parameter></pre>				
<pre>cparameter key="visco"reatment" value="1" comment="Viscowity formulation 1:Artificial, 2:Laminar+SPS (default=1)" /> cparameter key="visco" value="0.02" comment="viscowity value" /></pre>	<pre><parameter comment="Viscosity value" key="Visco" value="0.02"></parameter></pre>				
<pre><pre>cyparameter key="ViscoBoundFactor" value="1" comment="Multiply viscosity value with boundary (default=1)" /></pre></pre>	<pre><pre>cparameter key="ViscoBoundFactor" value="1" comment="Multiply viscosity value with boundary (default=1)" /></pre></pre>				
<pre><pre><pre>cparameter key="DeltaSPH" value="0" comment="DeltaSPH value, 0.1 is the typical value, with 0 disabled (default=0)" /></pre></pre></pre>	<pre>cparameter key="DeltASPH" value="0" comment="DeltASPH value, 0.1 is the typical value, with 0 disabled (default=0)" /></pre>				
<pre><pre>cparameter key="#Shifting" value="0" comment="Shifting mode 0:None, 1:Ignore bound, 2:Ignore fixed, 3:Full (default=0)" /></pre></pre>	<pre><pre>cprimeter wey splittering value = 0 comments and the primeter source bound, righter bound, ris righter bound, righte</pre></pre>				
<pre>cparameter key="#ShiftCodf" value="-2" comment="Coefficient for shifting computation (default=-2)" /> cparameter key="#ShiftToff"s value="-1.5" comment="Threshold to detect free surface. Typically 1.5 for 2D and 2.75 for 3D (default=0)" /></pre>	<pre>cparameter key="#ShiftTFS" value="1.5" comment="Threshold to detect free surface. Typically 1.5 for 2D and 2.75 for 3D (default=0)" /></pre>				
<pre>cyprameter key="sinicities value" is comments" minestoria do deceder tree sarrades : pyroanty is for ab and 2:55 for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder tree sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder tree sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter key="sinicities value" in comments" minestoria do deceder free sarrades : pyroanty is for ab (decadic=0) // cyprameter : pyroanty is for ab (decadic=0) // cypra</pre>	<pre>cparameter key="RigidAlgorithm" value="1" comment="Rigid Algorithm 1:SPH, 2:DEM (default=1)" /></pre>				
<pre><pre>cparameter key="FtPause" value="0.0" comment="Time to freeze the floatings at simulation start (warmup) (default=0)" units_comment="seconds" /></pre></pre>	<pre><parameter comment="Time to freeze the floatings at simulation start (warmup) (default=0)" key="FtFause" units_comment="seconds" value="0.0"></parameter></pre>				
<pre><pre><pre>cparameter key="CoefDtHin" value="0.05" comment="Coefficient to calculate minimum time step dtmin=coefdtemin*h/speedsound (default=0.05)" /></pre></pre></pre>	<pre><pre><pre>cparameter key="CoefDtMin" value="0.05" comment="Coefficient to calculate minimum time step dtmin=coefdtemin+h/speedsound (default=0.05)" /></pre></pre></pre>				
<pre>cparameter key="#DLIni" value="0.0001" comment="Initial time stop (default=h/speedsound" units_comment="seconds" /></pre>	<pre>cparameter key="#Dtin" value="0.0001" comment="Initial time step (default=>=>//peedsound" units_comment="seconds" /></pre>				
<pre>cparameter key=#9DtMin" value="0.00001" comment="Minisum time step (default-coefditainth/speedsound)" units_comment="seconds" /> cparameter key=#9DtMind" value="DtMind".ath" values are loaded from file (default-desabled)" /></pre>	<pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>				
<pre>cparameter key="DtAllParticles" value="0" comment="Velocity of particles used to calculate DT. 1:All, 0:Only fluid/floating (default=0)" /></pre>	<pre>cparameter key="DtAllParticles" value="0" comment="Velocity of particles used to calculate DT. 1:All, 0:Only fluid/floating (default=0)" /></pre>				
<pre><pre>cparameter key="TimeMax" value="0.72" comment="Time of simulation" units_comment="seconds" /></pre></pre>	<pre>cparameter key="TimeMax" value="0.72" comment="Time of simulation" units_comment="seconds" /></pre>				
<pre><pre><pre>cparameter key="TimeOut" value="0.01" comment="Time out data" units_comment="seconds" /></pre></pre></pre>	<pre><parameter comment="Time out data" key="TimeOut" units_comment="seconds" value="0.01"></parameter></pre>				
<pre><pre>cparameter key="Inc2" value="1" comment="Increase of Z+" units_comment="decimal" /></pre></pre>	<pre><pre>rameter key="Inc2" value="1" comment="Increase of Z+" units_comment="decimal" /></pre></pre>				
<pre>cparameter key="%artsoutMax" value*": comment="Allowed 4/100 of fluid particles out the domain (default-1)" units_comment="decimal" /> cparameter key="%hopduthin" value="70" comment="Walld" (default-70)" units_comment="Walld") /> </pre>	<pre>cparameter key="PartsOutMax" value="1" comment="Allowed %/100 of fluid particles ont the domain (default=1)" units_comment="decimal" /></pre>				
<pre>cparameter key="Khopoutkar" value="1000" comment="Maximum rhop valid (default=1000)" units_comment="kg/m3" /></pre>	<pre>cparameter key="%hopOtMin" value="700" comment="Minisum rhop valid (default=700)" units_comment="Ka/M3" /></pre>				
	parameters and another the state into commence maximum rive varia (decade 100) unce commence agring (2				
<pre></pre>	<pre><pre>cparticles np="21001" nb="1001" mkboundfirst="11" mkfluidfirst="1"></pre></pre>				
	<fixed begin="0" count="1001" mk="11" mkbound="0"></fixed>				
	<fluid begin="1001" count="20000" mk="1" mkfluid="0"></fluid>				
	<pre>constants></pre>				
	<pre><gravity x="0" y="0" z="-">.01 units_comment= m/s/2" /> <cfnumber value='0.2"'></cfnumber></gravity></pre>				
	<garma value="7"></garma>				
	<rhop0 units_comment="kg/m3" value="1000"></rhop0>				
	<pre><dp units_comment="metres (m)" value="0.01"></dp></pre>				
	<h units_comment="metres (m)" value="1.4142135624E-002"></h>				
	<pre><massbound units_comment="kg" value="1.000000000B-001"></massbound></pre>				
	<pre><massfluid units_comment="kg" value="1.000000000E-001"></massfluid></pre>				

</constants> <motion />

Summary of the number of created particles and computed constants

<particles np="21001" nb="1001" nbf="1001" mkboundfirst="11" mkfluidfirst="1">



YOU SHOULD ALWAYS CHECK Case_All.vtk, Case_Bound.vtk, Case_Fluid.vtk

Outline of Presentation

Pre-processing tool: GenCase

• XML input file

• DesignSPHysics: new GUI !!!

• Future developments

DesignSPHysics A simple user interface for DualSPHysics



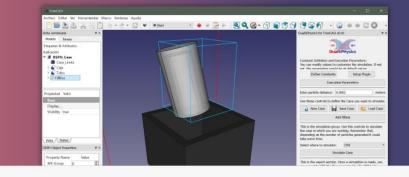
Andrés Vieira



Overview Features Help Download

DesignSPHysics

A simple user interface for DualSPHysics



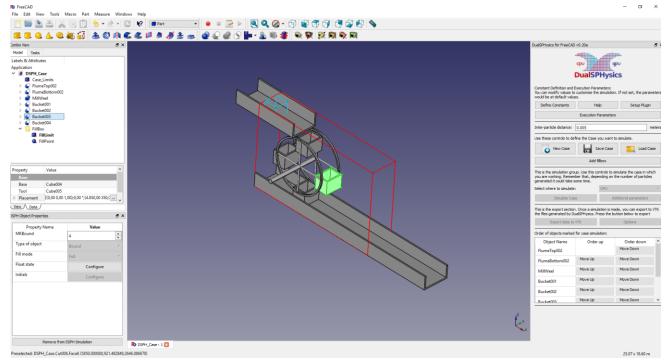


DesignSPHysics

A simple user interface for DualSPHysics



Modular: Integrates with FreeCAD, it is simple and easy to use. Configurable: No need to edit external files or work with messy code. Not only case design: It can run a simulation clicking on a button. Coherent GUI: Easy to use, easy to learn.

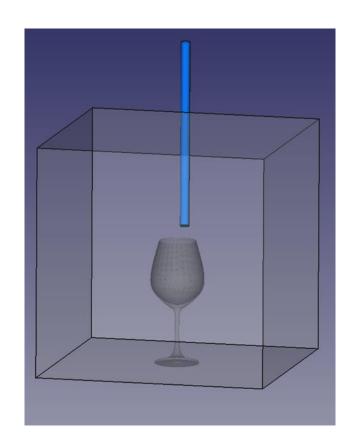


Let us try DesignSPHysics

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Property Name Value MKFluid 1	Y		cup	Move Up	
Type of object Fluid Fill mode Full					
Float state Configure					
Initials Configure					
Remove from DSPH Simulation			Ĵ×		

STEPS in DesignSPHysics

- Install FreeCAD version 0.16 or higher (<u>https://sourceforge.net/projects/free-cad/</u>)
- Download DesignSPHysics beta-version-> Installer.exe
- Open FreeCAD
- Opens a dialog to let you execute a recorded macro: Use DSPH.py at %appdata%/FreeCAD/Macro
- New Case: DSPH_Case (CaseWine)
 - Case_Limits
 - Base/Placement/Position: x=-0.5m, y=-0.5m, z=-0.5m
 - Box: Length=1m, Width=1m, Height=1.5m
 - o Cube
 - Base/Placement/Position: x=-0.25m, y=-0.25m, z=0m
 - Box: Length=0.5m, Width=0.5m, Height=0.5m
 - ADD TO DSPH SIMULATION
 - MKBound=0, Type of object=Bound, Fill mode=Wire
 - o Cylinder
 - Base/Placement/Position: x=0.015m, y=0m, z=0.3m
 - Cylinder: Radius=0.01m, Height=0.4m, Angle=360°
 - ADD TO DSPH SIMULATION
 - MKFluid=1, Type of object=Fluid, Fill mode=Full
 - Import: cup.stl (reads assuming units in mm)
 - ADD TO DSPH SIMULATION
 - MKBound=1, Type of object=Bound, Fill mode=Face
 - Inter-particle distance=0.001 meters
 - o Define Constants
 - Execution Parameters
 - Time of simulation=1 seconds
 - Time out data=0.005 seconds
 - Setup Plugin: path of GenCase4, DualSPHyics4, PartVTK4
 - Save Case: Executes GenCase4 (creates .XML and initial .BI4)
 - Simulate Case: Executes DualSPHysics4 (CPU or GPU)
 - Export data to VTK: Executes PartVTK4 (VTK of all particles)



Visualisation in Paraview loading VTK files



Outline of Presentation

Pre-processing tool: GenCase

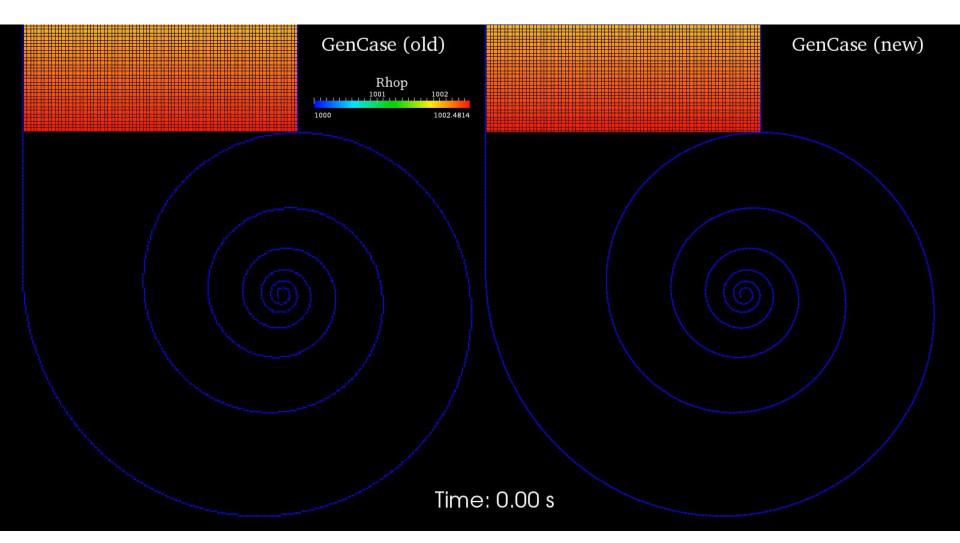
• XML input file

• DesignSPHysics: new GUI !!!

• Future developments

Future developments

• FreePoints



Future developments

• FreePoints

• Computation of normals (new BCs)

• Release of DesignSPHysics



Thank you

Acknowledgements

- DualSPHysics team: all developers and contributors
- Andrés Vieira

Website

Free open-source **DualSPHysics** code: http://www.dual.sphysics.org

