
emNewton Version 1.51

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Chapter 1: Introduction

This plug-in for XSI's ICE is a solver for Newton's Laws of Gravity. It is based on a plug-in I wrote a few years ago (and never released). It will calculate the positions, velocities and velocity forces depending on the particles masses and distances. Also, it allows you to "melt" particles when they intersect.

Please take a look at the ICE Trees in the demo ("inAction" – scenes) and tutorial scenes. The ICE Trees contain comment nodes for an easier understanding.

On my website (<http://www.mootzoid.com/XsiCorner.html>) you can take a look at some animations that were made using this plug-in.

Have fun with this little program!

Chapter 2: Installation

2.1 Copy the files "emNewton.xx.dll" into the user's plug-in directories of XSI, e.g.: "C:\Users\Administrator\Softimage\XSI_7.0\Application\Plugins". Please do NOT copy it into the workgroup folder. I don't know why, but that seems to be a problem for XSI and the plug-in won't be loaded.

Important: older versions of emNewton should be removed. Simply delete the old emNewton.dll.

2.2 Copy the file "emNewton Basic Setup.xsicompound" into one of XSI's compound folders, e.g.: "C:\Users\Administrator\Softimage\XSI_7.0\Data\Compounds". You can also copy it into the workgroup folder.

2.3 Start XSI and open an ICE Tree. In the category "Custom ICENode" you should see a node called "emNewton" and a compound called "emNewton Basic Setup". If not, please check the Script Editor's log for any error messages. If there are no error messages, then you probably copied the files into a location not known by XSI.

Chapter 3: The node's parameters

3.1 Quick overview

- **„Enable“**
Enables/disables the effect. If disabled, the node passes the input values through the node without altering them.
Type: boolean (per object)
Range: true or false
Default value: true
Script name: „enable“

- **„Verbose (0=off)“**
Sets the amount of text the node generates in the History Log of the Script Editor.
Type: integer (per object)
Range: -infinite to +infinite
Default value: 1
Script name: „verbose“

- **„In Point Positions“**
The input array with the actual positions of the points.
Type: 3D vector (per object or point)
Default value: (0,0,0)
Script name: „pntpositions“

- **„In Point Velocities“**
The input array with the actual velocities of the points.
Type: 3D vector (per object or point)
Default value: (0,0,0)
Script name: „pntvelocities“

- **„In Point Sizes“**
The input array with the actual sizes of the points.
Type: scalar (per object or point)
Default value: 0.5
Script name: „pntsizes“

- **„In Point Masses“**
The input array with the actual masses of the points.
Type: scalar (per object or point)
Default value: 0.1
Script name: „pntmasses“

- „In Point Colors“
The input array with the actual colors of the points.
Type: color (per object or point)
Default value: (0.1, 0.2, 0.9, 1.0)
Script name: „pntcolors“

- „Frame Rate of the Scene“
The scene's frame rate.
Type: scalar (per object)
Range: 1 to infinite
Default value: preferences' default frame rate
Script name: „framerate“

- „maximum Octree Depth“
The maximum depth of the octree.
Type: integer (per object)
Range: 0 to 20
Default value: 12
Script name: „maxoctreedepth“

- „Accuracy of the Simulation“
The accuracy of the simulation.
Type: scalar (per object)
Range: 0 to 10
Default value: 3
Script name: „accuracy“

- „Gravity Constant“
The gravitation force vectors are multiplied by this value.
Negative values produce negative gravitation force.
Type: scalar (per object or point)
Range: - infinite to +infinite
Default value: 1
Script name: „gravconst“

- „Hold Radius (no Gravity)“
Type: scalar (per object or point)
Range: 0 to infinite
Default value: 1
Script name: „holdnogravpradius“

- „Hold Distance (fade out Gravity)“
Type: scalar (per object)
Range: 0 to infinite
Default value: 1.5
Script name: „holdfadeoutgravdist“

- „Hold Distance (fade in Gravity)“
 - Type: scalar (per object)
 - Range: 0 to holdfadeoutgravdist
 - Default value: 1
 - Script name: „holdfadeingravdist“

- „Melt Strength“
 - Specifies how fast mass flows from one particle to another when they intersect. Set this equal zero to deactivate the melting.
 - Type: scalar (per object or point)
 - Range: 0 to 10
 - Default value: 0.75
 - Script name: „meltstrength“

- „Melt mix-add RGB“
 - Controls the way how the color of one particle affects the color of another particle when they melt together. A value of zero would only mix the colors, a value of 10 would add the colors. Both ways are done depending on the particles' masses. Values between 0 and 10 mix the effect, e.g. a value of 2 would mainly mix the colors, but also add a little color, making the particle a little brighter.
 - Type: scalar (per object or point)
 - Range: 0 to 10
 - Default value: 2
 - Script name: „meltmixaddRGB“

- „Melt mix-add Alpha“
 - Same as “Melt mix-add RGB”, but for the Alpha channel.
 - Type: scalar (per object or point)
 - Range: 0 to 10
 - Default value: 5
 - Script name: „meltmixaddAlpha“

- „Melt clip RGB“
 - If set equal “true” the RGB values at clipped at 0.0 and 1.0 when particles melt together. Disabling this allows RGB values to be greater than 1 or less than zero.
 - Type: boolean (per object or point)
 - Range: true or false
 - Default value: true
 - Script name: „meltclipRGB“

- „Melt clip Alpha“
 - Same as “Melt clip RGB”, but for the Alpha channel.
 - Type: boolean (per object or point)
 - Range: true or false
 - Default value: true
 - Script name: „meltclipAlpha“

Epilog: Thanks

I would like to thank my friend and “ICE guru” Oliver Weingarten (www.pixelpanic.de). We spent many hours talking on the telephone about how to implement the different algorithms, get rid of bugs, etc. He was a great help and motivator while working on this project.