

Appendix D

Particle Curve Flow - Houdini helpcard

Particle Curve Flow

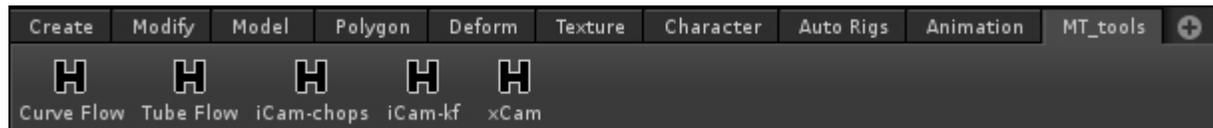
Tool for creating particles flowing along a curve.

This tool's interface mimics the interface of Maya's *Effects > Create Curve Flow* tool to make it easier for Maya users to transition to Houdini.

[Using the tool](#) | [Tool dialog options](#) | [Modifying an existing setup](#) | [Example files](#)

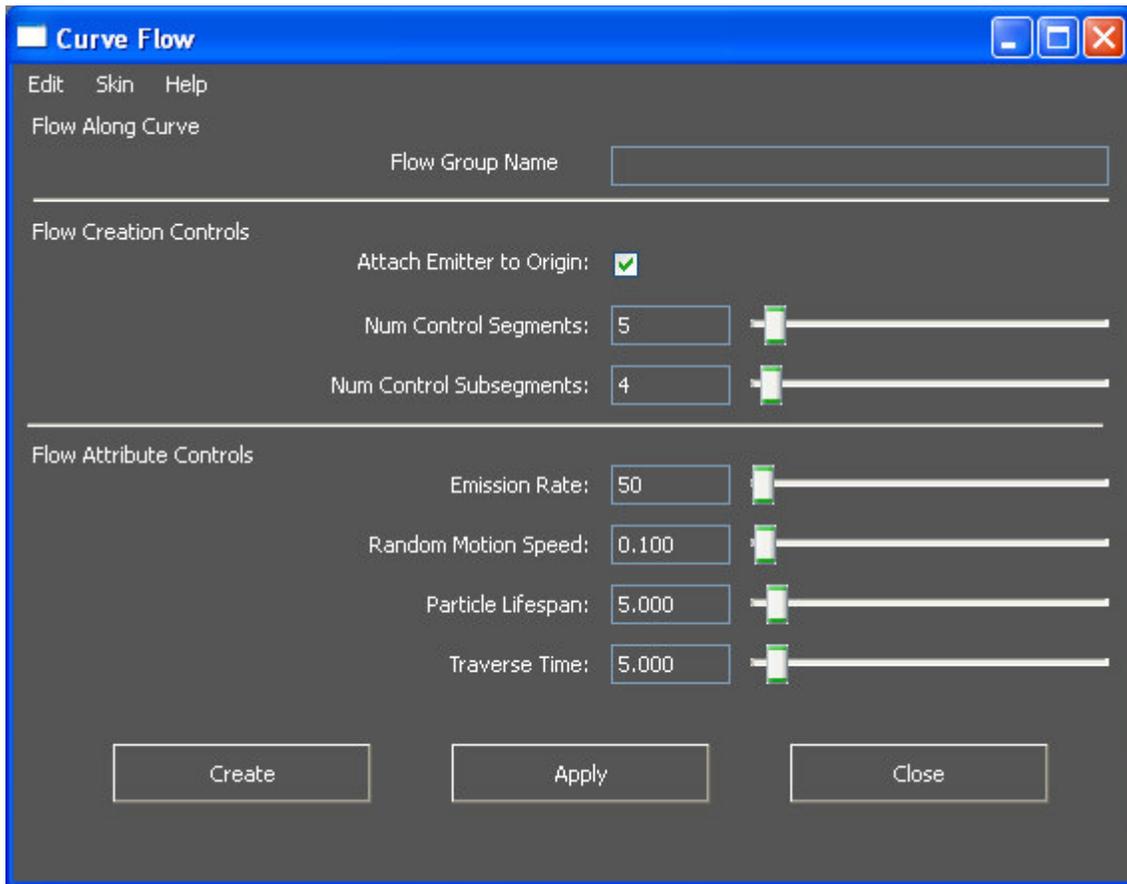
Using the Particle Curve Flow tool

There are two ways to use the tool, which is accessible via the Curve Flow icon on the custom shelf called MT_tools.



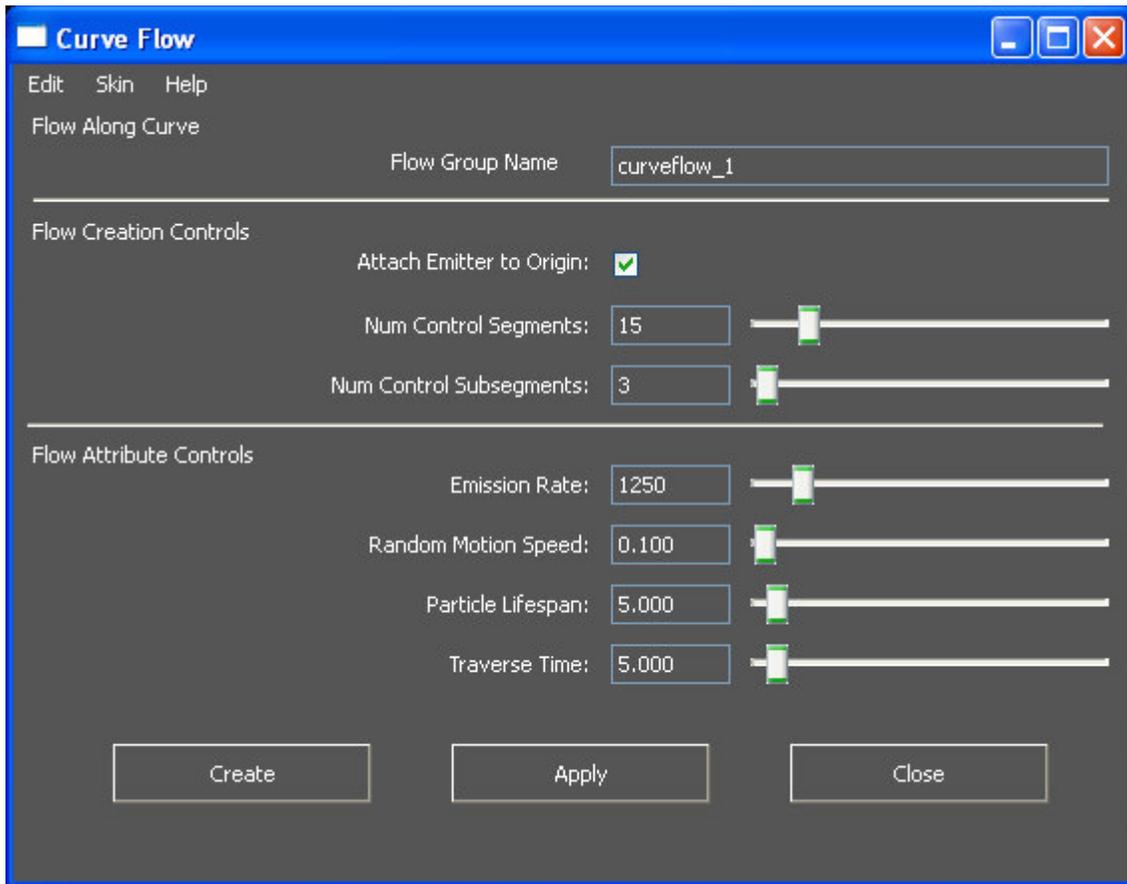
I. Automatically create a particle flow:

1. Select the object containing the curve geometry.
2. *Ctrl+click* the tool's icon to create a curve flow with default parameters (see next snapshot for defaults).



II. Manually enter parameter values:

1. Select the object containing the curve geometry.
2. Click the tool's icon.
3. Modify the parameters available in the dialog (or use the default values), then press *Create*.
The dialog will close automatically.
Alternatively, create several flows for the same curve selection using the *Apply* button, then press *Close* to close the dialog.



Tool Dialog Options

Flow Along Curves

Flow Group Name	Name of the geometry object which will contain the network created by the tool. If you don't enter a name, Houdini creates a default name.
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Flow Creation Controls

Attach Emitter to Origin	If on, the emitter created by the Curve Flow effect is placed at the origin of the curve. If off, the emitter is placed at the world origin.
Num Control Segments	Sets the number of segments into which the curve is divided (along with Num Control Subsegments). Higher numbers cause particles to follow the curve more precisely. Lower numbers improve playback speed.
Num Control Subsegments	Sets the number of sub-segments. Higher numbers cause particles to follow the curve more precisely. Lower numbers improve playback speed.

Flow Attribute Controls

Emission Rate	Sets the number of particles emitted each second.
Random Motion Speed	Sets the magnitude of the arbitrary directional force applied to the particles as they move along the curve.
Particles Lifespan	Sets how many seconds each emitted particle lives.

<p>Traverse Time</p>	<p>Determines how quickly the particles will traverse the curve (when they travel close to it). For example with a lifespan of 5, the particles will try to traverse the curve in 5 seconds. Higher values make the particles move slower.</p> <p>Note: when lifespan is smaller than curve length, the particles may travel too quickly to be affected by the default force magnitudes. You can use the force parameters in the Curve Flow > Forces tab to increase the edge force and/or the radial force, which keep the particles close to the curve and guide them along the curve. See the explanation on using the Forces tab below for more details.</p>
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Tool Dialog Menus

Edit

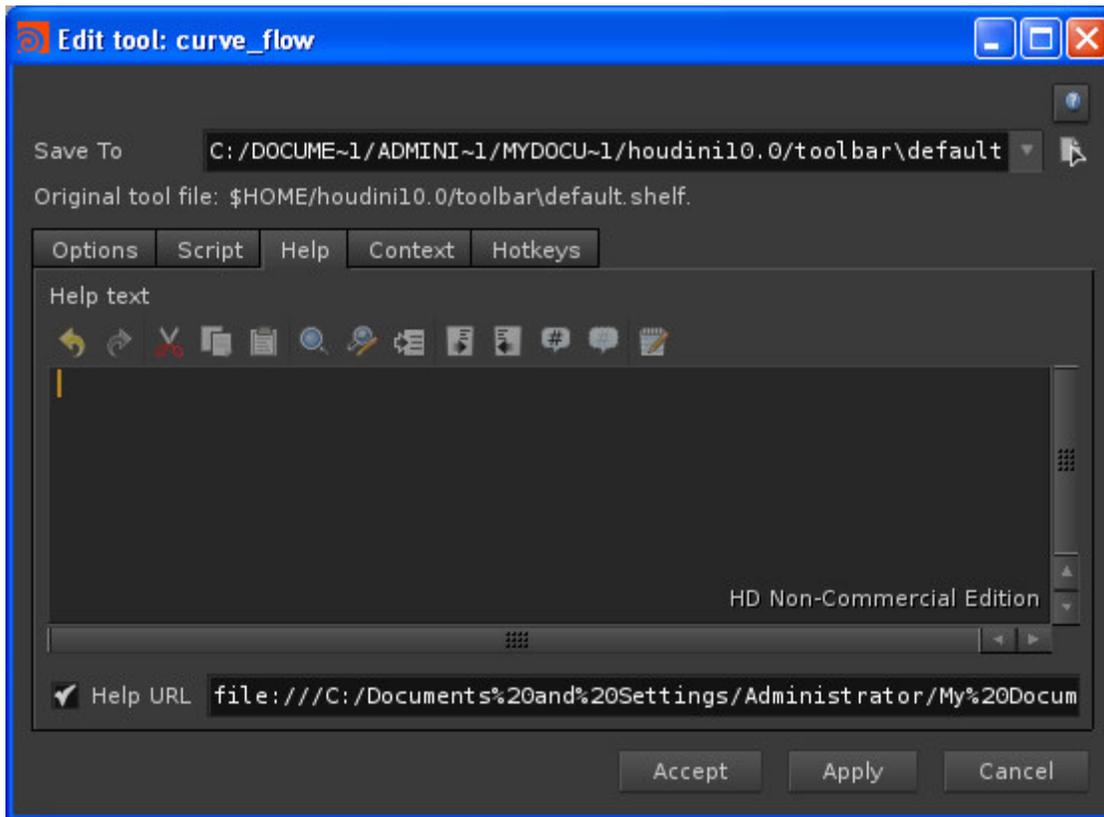
<p>Save Settings</p>	<p>Saves the dialog settings to \$HOUDINI_HOME/houdini_curve_flow.pref, where \$HOUDINI_HOME is Houdini's home directory. For example, for Houdini 10, On Windows it defaults to My Documents/houdini10.0/, whereas on Linux it defaults to ~/houdini10.0/</p>
<p>Reset Settings</p>	<p>Resets the values to the defaults.</p>
<p>Import Settings</p>	<p>Imports the settings from an external file.</p>
<p>Export Settings</p>	<p>Exports the settings to an external file.</p>

Skin

<p>Light</p>	<p>Sets the dialog's colors to lightgray background and black text font.</p>
<p>Dark</p>	<p>Sets the dialog's colors to darkgray background and lightgray text font.</p>

Help

<p>Help on Particle Curve Flow Tool</p>	<p>Opens this helpcard in a Houdini help browser.</p> <p>Note: You can also open the helpcard by hovering the mouse pointer over the tool's icon and pressing F1. To enable this behavior, you need to enter the location of this helpfile in the Help URL in the tool's Help tab.</p>
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Modifying an existing setup

After the tool's dialog window has been closed, users still have high-level control over the curve flow setup. This is done via spare parameters in the custom “Flow” tab of the geometry object created by the tool.

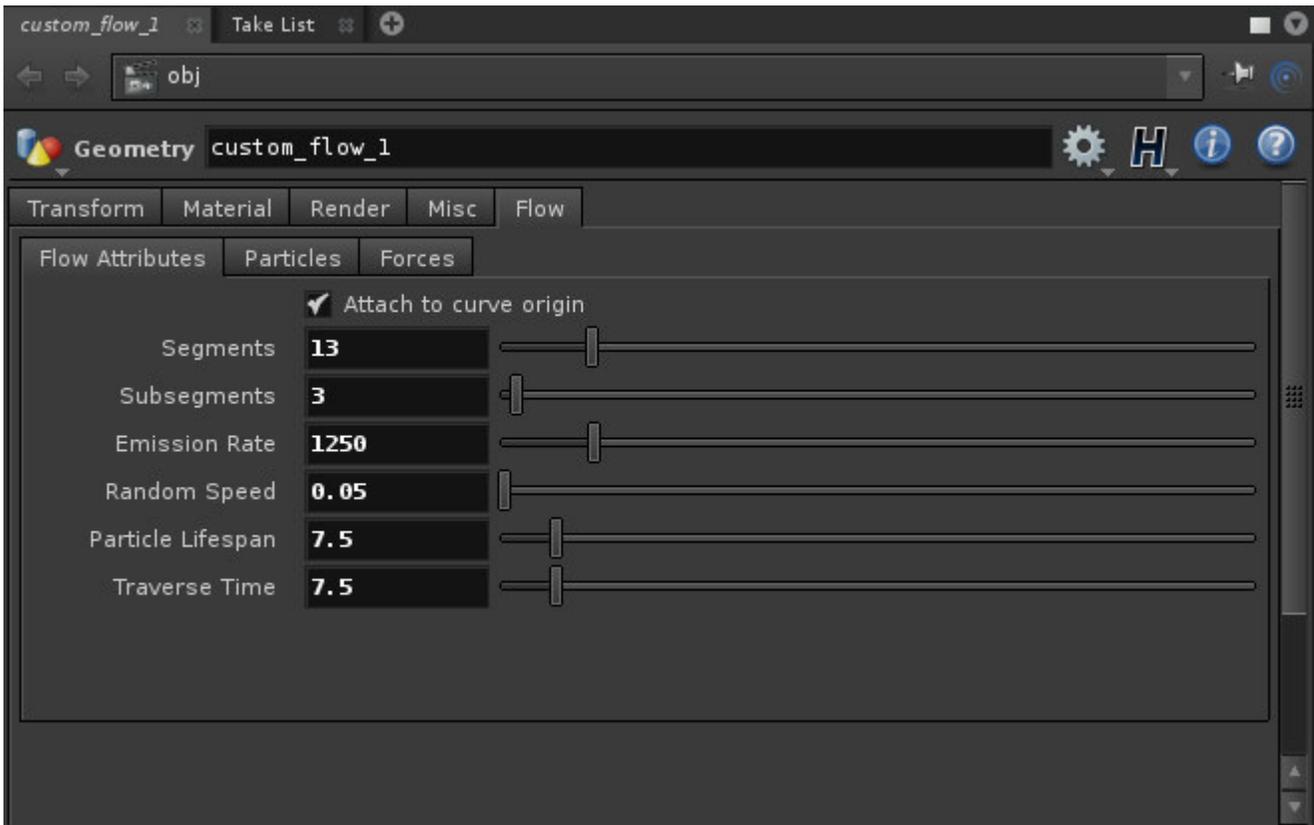
Flow Attributes

These are Flow Attribute settings replicated from the tool's dialog window.

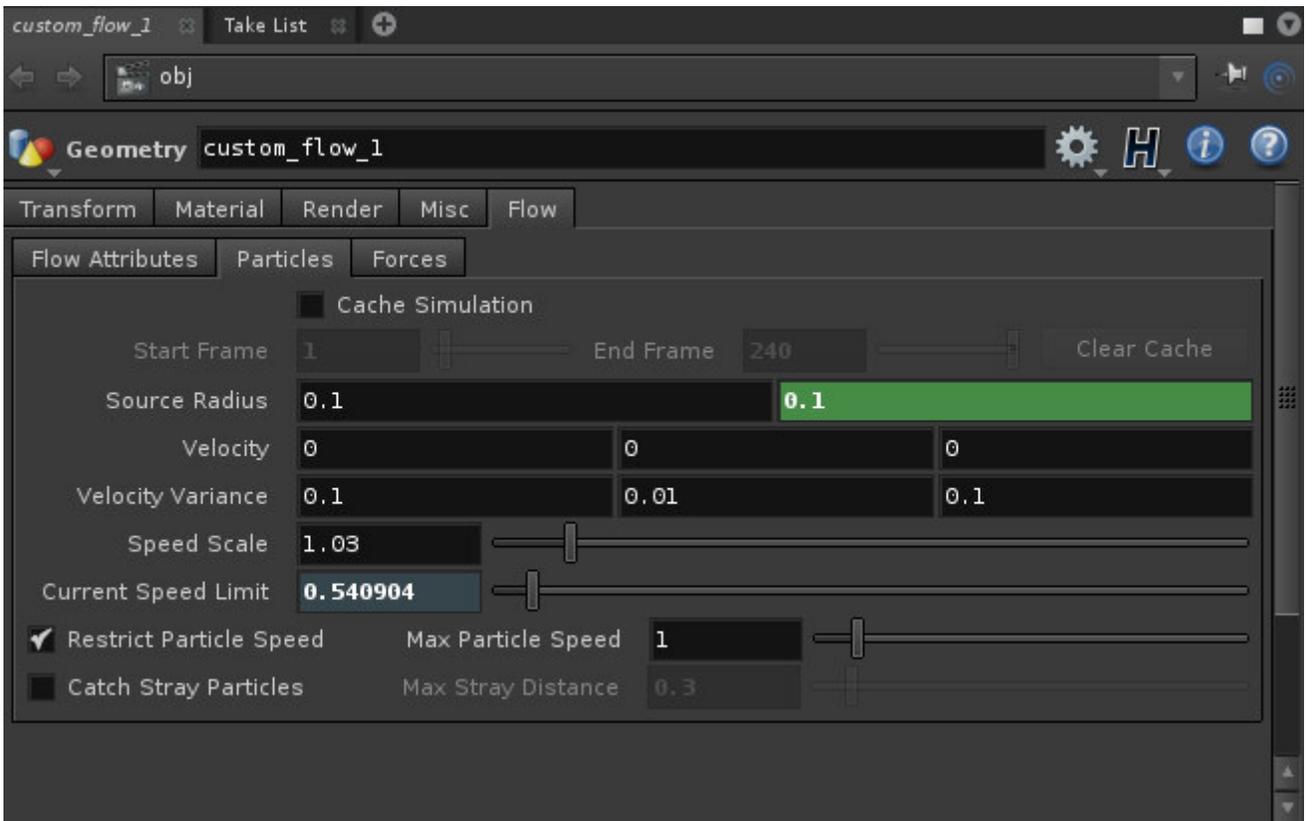
While Maya's *Create Curve Flow Effect* tool does not allow changing the first three parameters after the effect has been created,

Houdini's procedural nature allows changing them as well.

Adjust the values, rewind to frame 1 if necessary, and rerun the particle simulation.



Particles

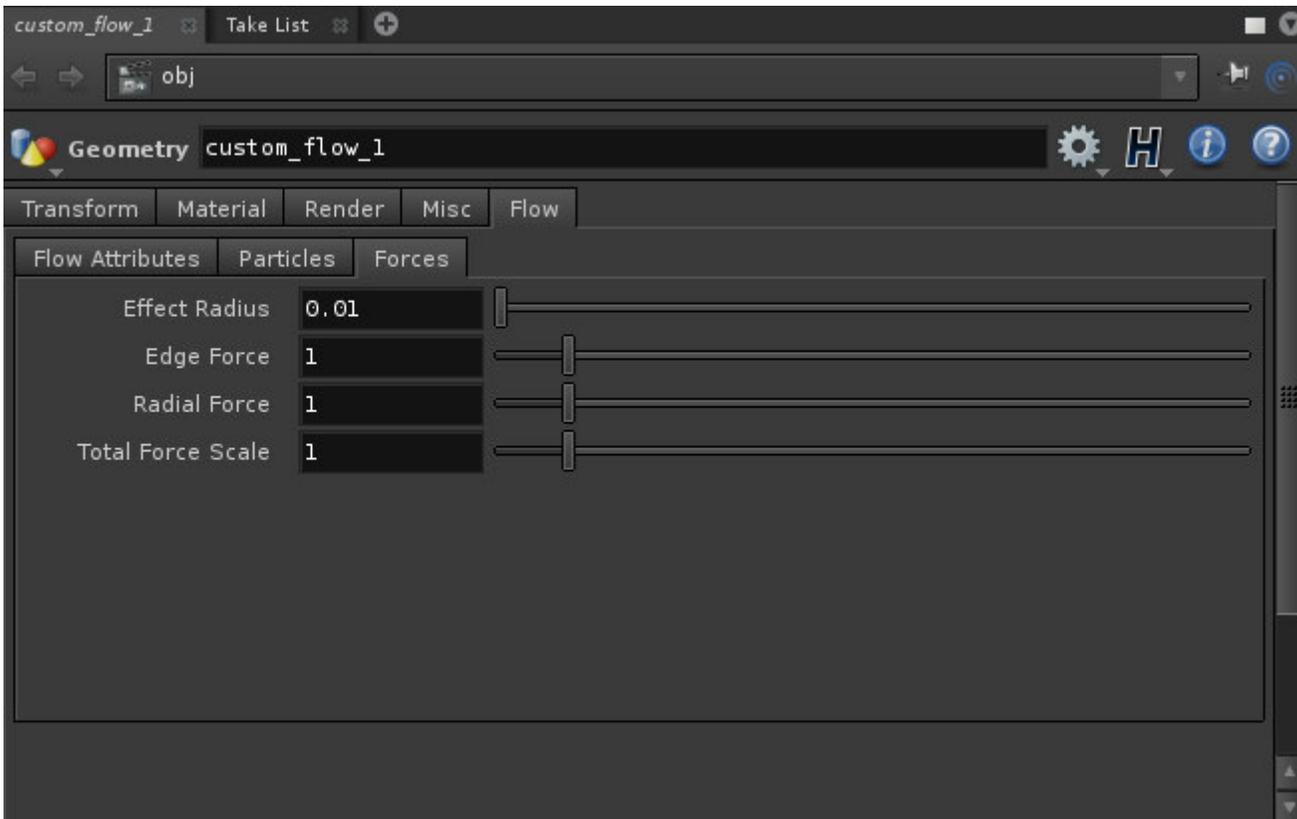


Cache Simulation	Enable/disable caching.
Start/End Frame	By default caching is set to run from the first until the last frame of the playbar.

Clear Cache	Use to rerun a particle simulation when parameters have been changed or before you disable caching.
Source Radius	Sets the radius of the particle emitter.
Velocity	Sets the initial velocity of the particles.
Velocity Variance	Adds variance to the initial velocity.
Speed Scale	Adjusts particle speed to make sure they traverse the curve on time when the particles are (slightly) too quick or too slow.
Current Speed Limit	Used only for display purposes.
Restrict Particle Speed	If the Current Speed Limit displays a value close to or above 1, the default magnitudes of the forces probably won't be enough to keep the particles close to the curve. You can lower the ceiling of the particles' speed to keep them closer to the curve. However, slowing the particles down will affect the amount of time it takes them to traverse the curve. To avoid that, you can increase the forces that act on the particles (see Forces tab) instead.
Catch Stray Particles	Activates collision detection and ensures that particles are kept within a band around the curve controlled by Max Stray Distance (although the fastest particles may still be able to escape). Activating it may slow down simulation time significantly, so it's best to keep it toggled off unless too many particles stray.

Forces

These parameters are parameters from the Point SOP, which feeds into the particle network. They have been exposed for convenience.



Effect Radius	Radius of effect.
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Edge Force	Moves the particles along the curve. The greater the number of curve points, the more precisely edge force works.
Radial Force	Attracts the particles to the curve points. Note: High values (e. g., above 5) can cause the particles to jiggle too much or to move in a twisting pattern around the curve.
Total Force Scale	Acts as a multiplier for the total force.

Example files

`$HOME/mt_tools/help/particle_curve_flow/examples/`

These example files demonstrate various uses of the particle curve flow tool.