

The Ultimate Production Guide for Maya

- The Suite -

Handbook 7

Mixing Animation and Dynamics in Maya

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This Guide had been done by Markus Steinigeweg, and therefore he has the copyright of his work.
It is based on studies, ideas, research, and his experience with Maya from 2003 to 2011.

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Dynamic Animation

You can use the Animation Layer to mix an Animation with a Baked Dynamics Animation.

Another Way to have a Dynamic Animation is to Parent the Dynamic Objects to an Animated Object i.e. a Locator, or to animate the objects Pin Constraint or the Pin Constraints Locator, respectively.

1. Parent a Dynamic Object i.e. a GeoTransformNode (with its Childs: Shape and Rigid Body) to an Animated Locator.
2. Simply Animate the Dynamic Objects Dynamic Constraint i.e. Spring Constraint or better the Spring Constraints Locator: Animate a Locator and parent the Constraint to it. You can have a Field applied to the Active Rigid Body.

Tip:

**Now you also can do 1 Version with Animation Keys and 1 Version with Dynamics, and then mix and blend them using the Animation Layers.
It is good to Bake Simulation first.**

Dynamic Animation, The Trick:

You have a Character, i.e. with IK-Setup (with joints) .

You do the Character Animation with the joint's Animation Locators.
Or better, do joints's Spring Constrains (Stiffness to 1) parented to the Animation Locators.

Then, secondly, you Spring Constrain the joints, if not already done, to the Animation Locators with their Animation Curve, and set the Stiffness to a desired value between 0 and 1.

Then you apply the fields.

Do the Dynamics.

Bake Dynamic Simulation.

Then you can blend the Animation and the Baked Dynamic Simulation with the Animation Layers.

Or

Simply Parent Spring Constrain the Joints to the Locators.

Then Animate the Locators, and set the Spring Stiffness Value between 0 and 1 for the Dynamic Behaviour.

NOTE:

A Spring Constraint can ONLY be applied to a Rigid Body.
First Select the Rigid Body, then Create Spring Constraint.

Chapter 3

Combination of Animation and Dynamics - Examples

Read me first:

First open i.e. with Microsoft Media Player.

When opening it with Quick Time Player, Screen may be black.

Animation Dynamics Mix

Movie File: 1_AnimDynMix.avi

The red ball is keyframed, the blue ball and the plane are dynamic.

Legal Dynamic Animation Interpenetration

Movie File: 2_LegalDynAnimInterpen.avi

The red ball is keyframed, the blue ball and the plane are dynamic.

A legal interpenetration between the animated and the dynamic object occurs.

Animated Rigid Bodies and Interpenetration

Movie File: 3_AnimRigidInterpen.avi

Animated rigid bodies, which interpenetrate, should cause an error.

In Maya 2009 this is not a problem any more.

The interpenetration is legal.

Mixed Animation with Dynamics of a Rigid Body and Animated Object

Movie File: 4_AnimDynRigid.avi

The Above Animation with Keyframes smoothed out

Movie File: 5_AnimDynRigidSmoothed.avi

Baked Animation of Dynamic Rigid Body and Animated Rigid Body

Movie File: 6_BakDyn-AnimRigid.avi

Animated object with Particle Emission

Movie File: 6_AnimParticle.avi

Animated Position and Scale Attributes of an Emitting Object

Movie File: 7_AnimTP-TS-Particle.avi

"TP" stands for Transform Position, "TS" stands for Transform Scale.

Baked Animation of Keyframe Animation and Dynamics in Combination of an Emitting Rigid Body

Movie File: 8_BakAnimDynComb-Part.avi

"Part" stands for Particles