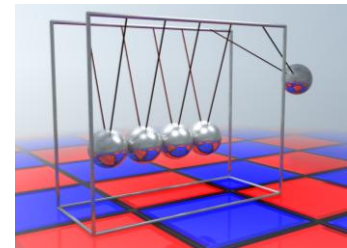


Newton's cradle using dynamics and Xpresso.

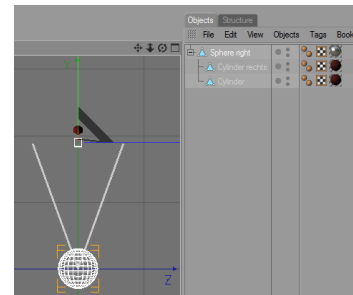
In this Cinema 4d 11.5 tutorial (level = moderate), I will show you how to create colliding / bouncing balls, a.k.a. Newton's cradle, using Cinema 4D dynamics and Xpresso.

Note: This tutorial shows you just another way to do things. In the 9.5 manual you will see Newton's cradle done only using dynamics.



For this tutorial I was triggered by reading Arndt von Koeningsmark book 'Cinema 4D 11 Workshop'.

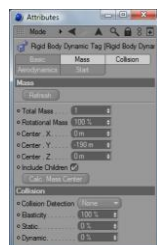
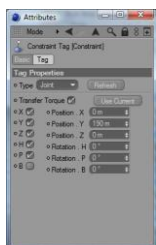
So, lets start with one sphere and ropes attached to the frame. I used a sphere and two cylinders as child of that sphere. Because we will rotate the sphere and ropes around the top of the frame, set the pivot accordingly.



The constrain tag.

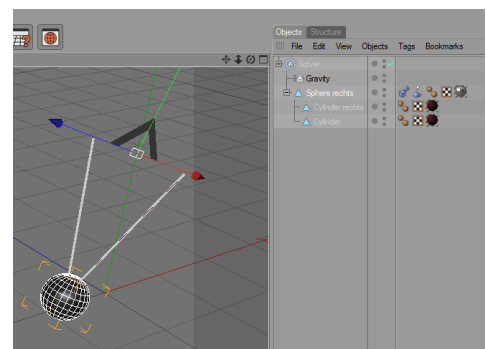
Now to let the sphere only rotate over the rotation B, add a Constrain Tag to the sphere. Select all except B. This way only rotation over B is possible.

Also add a Rigid Body Dynamics Tag. This tag makes sure that the dynamic simulation will recognize this object as a massive object and that it can be influenced by the Gravity force allowing it to swing.



Now because the pivot is at the top level of the frame, the Mass center will also be at that position. However, the Mass center must be at the center of the Sphere. Do this by setting (in my example) Center Y to -190.

Because we will do collision detection using Xpresso, set Collision detection to None.



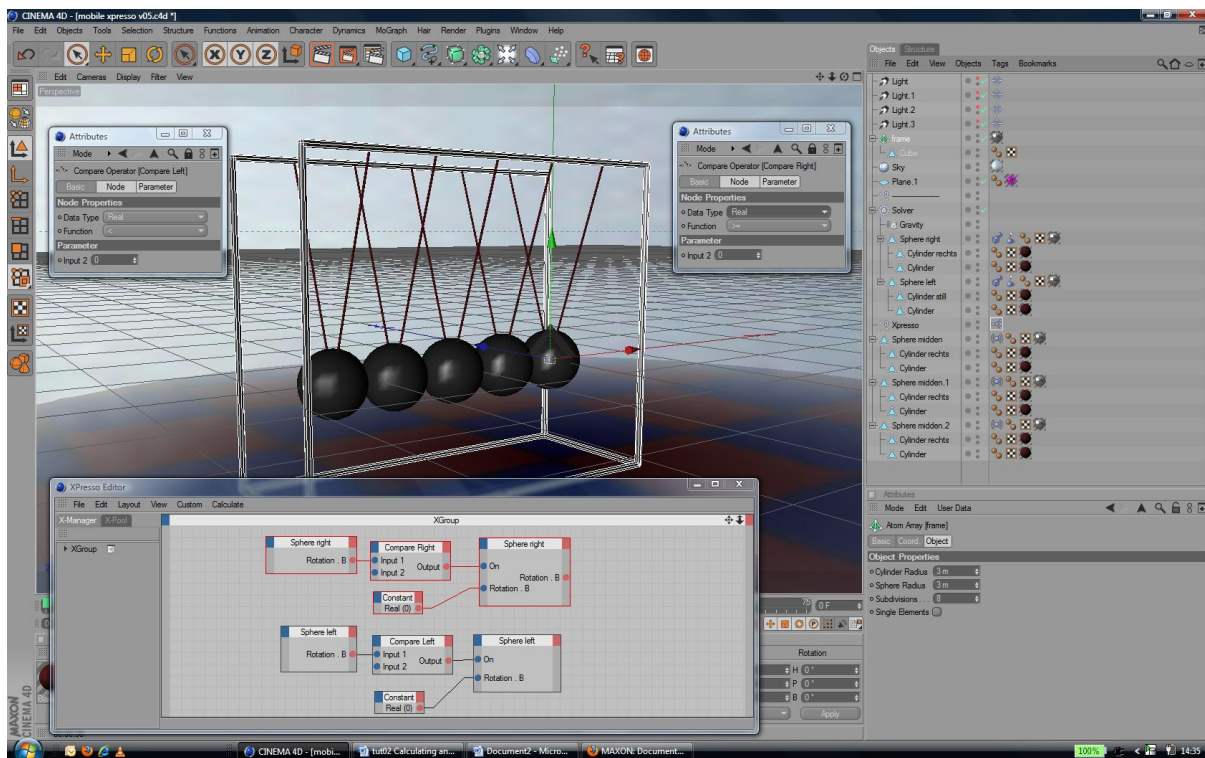
If you now add a Gravity Object and (of course) the Solver Object and start Play, you will see the sphere swing up and down.

Now add 4 more Spheres and create the frame.

Do not use a Rigid Body or Constrain Tag for the 3 middle spheres.

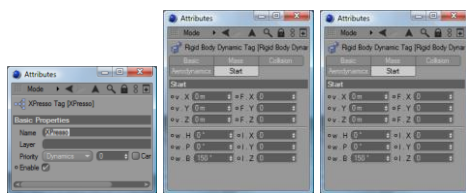
Also place the 3 middle spheres outside the Solver Object.

Now for the 'collision' part we will use Xpresso.



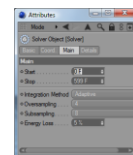
What I'm basically doing is to compare the B rotations of the spheres. For the right sphere I set the B rotation to 0 if it is ≥ 0 . For the left sphere I set the B rotation to 0 if it is < 0 .

To start the swing, give the spheres a start rotation. Do this by setting Rigid Body Dynamics Tag > Start > .w.B to 150. Also set the Xpresso Priority to Dynamics instead of Expression.



To give the impression that the 3 middle sphere are also impacted by the collision, I added a Vibrate Expression Tag to these spheres.

You can play with the Solver Object > Energy Loss parameter to control how long it will take end the swing. When you set it to 0, the swing will never end. In my case, I set it to 1.



See an example of the animation on my website [YouTube](#). Enjoy.