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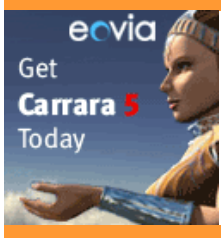


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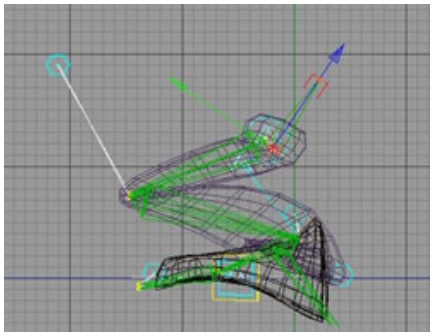
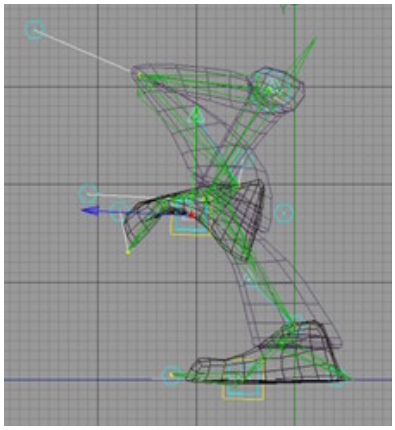
## 05.17.2003 Leg Rig Tutorial Update:

After experimenting a while with my leg rig, I discovered a couple of problems with the stability of the bones in the feet.



... and also, when I moved the Foot Controller way up high as to create a pose of "stepping into the saddle".



I seems that when the leg is folded up tight, the strength of the forces start to conflict with each other. While the rig was in these particular poses, I discovered that by decreasing the Rest Rotation strengths of the Thigh and Shin bones, the feet straightened themselves out.

I needed to add another Xpresso expression to determine the distance between the Pelvis and Foot bones and alter the Rest Rotation strength of the Thigh and Shin bones accordingly.

This expression needs to be written for the Left Thigh, Left Shin, Right Thigh and Right Shin bones. I'll go through the expression on the Left Thigh, then you'll just need to repeat the process for the other bones.

First, in the Object Manager, Command-click (*right click on a PC*) on the Left Thigh bone and select *New Expression > XPresso Expression* from the context menu.

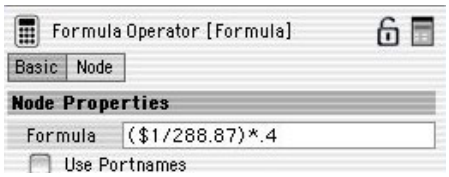
Drag the Pelvis and the Left Foot into the newly opened Xpresso window. Click on the red corner of both of these and select *Coordinates > Global Position > Global Position.*

In the XPresso Editor, Command-click (*right click on a PC*) and select *New Node > XPresso > Calculate > Distance* from the context menu.

Again, in the XPresso Editor, Command-click (*right click on a PC*) and select *New Node > XPresso > Calculate > Formula* from the context menu.

Select the Formula node and in the Attributes Manager on the Node page, type in this formula:

($1/288.87)*.4

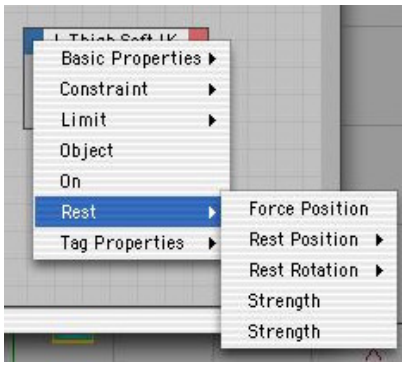


**Explanation:**

> The formula is finding the global distance between the Pelvis and Foot bones, dividing that distance by the combined lengths of the Thigh and Shin bones (288.87), and then multiplying that result by the optimum Rest Rotation strength of 40%(.4).

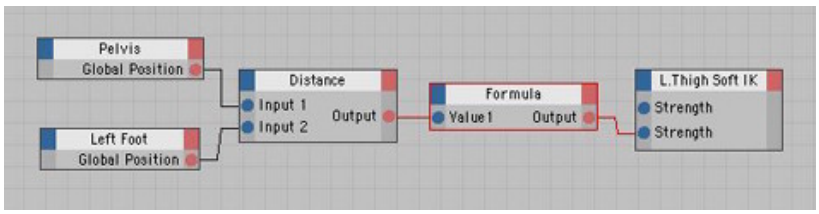
OK, now in the Object Manager, select the Left Thigh's Soft IK tag and in the Attributes Manager on the Basic Page, change the name to L.Thigh Soft IK or something other than the default name. (This just avoids any confusion if you copy this expression to the other bones and replace the names of the nodes.)

Now drag the L.Thigh Soft IK tag into the Xpresso window. Click on the blue corner and select *Rest .* You'll see a submenu appear with these selections:

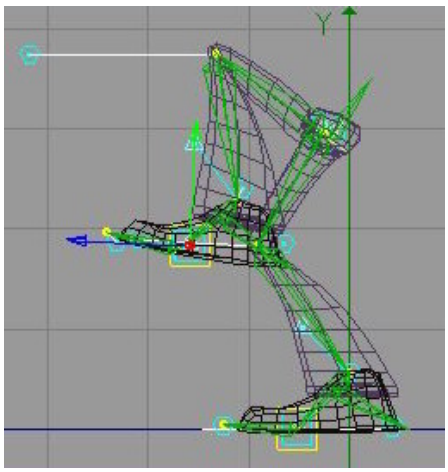



There is a slight bug here. It seems that Xpresso can't distinguish between the two *Strength* parameters in this node. The work around is to select the top one first and then select the bottom one so that you end up having two "Strength" ports in the node. Then you'll only connect a wire to the bottom one.

Now connect the nodes as shown below:




Once you've written this expression for all four of the above mentioned bones, you'll notice the feet will behave much better for the more extreme poses like the one to the right.



I hope you've found this useful.

Adios, Cactus Dan

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