

Building an IK Model

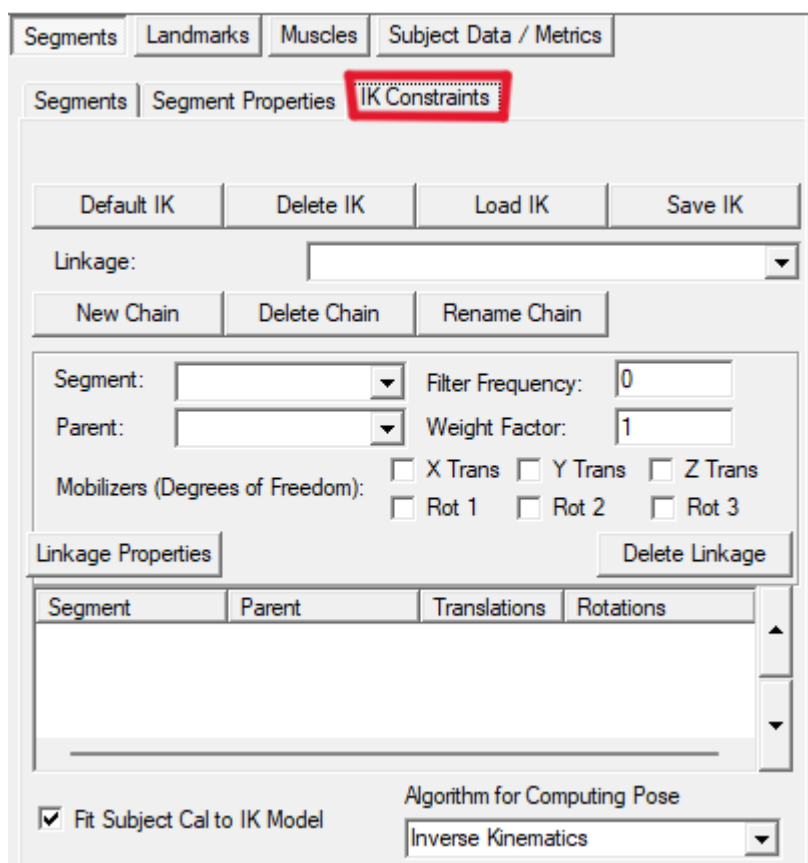
Introduction

This tutorial will show you step by step how to build an IK model. The file used for this tutorial is the file used for the [Building a 6 DOF Model](#) tutorial.

There is also a video tutorial available [here](#)

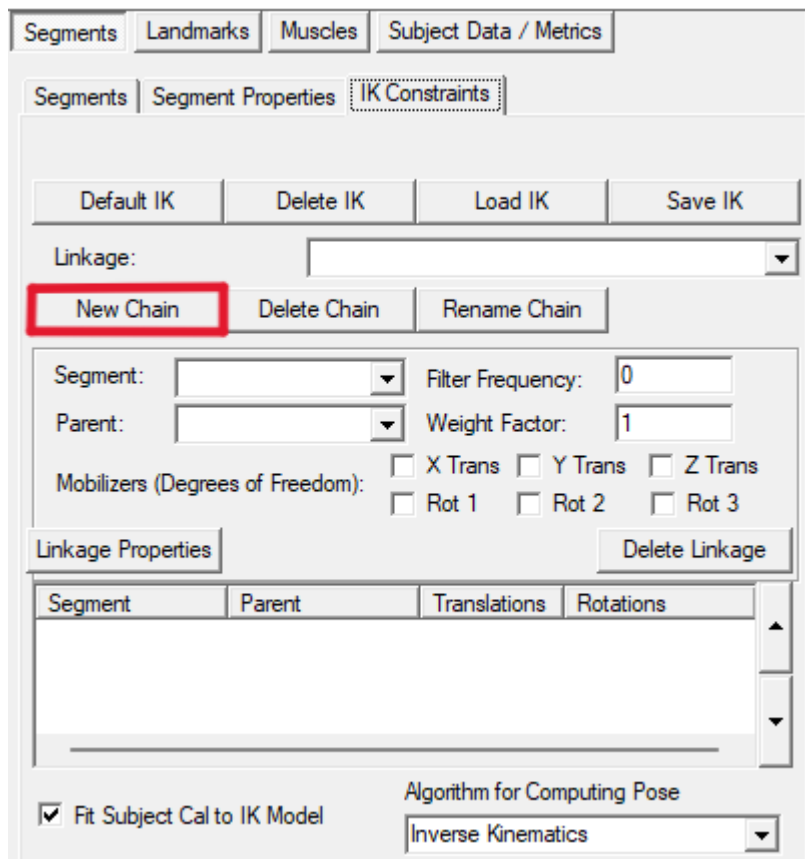
Tutorial

1. Open the file and go to the Models tab.
2. Under the Segments tab open the IK Constraints tab.

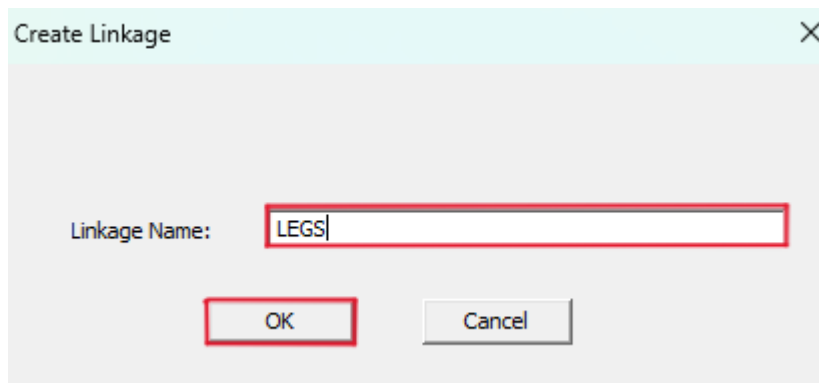


The screenshot shows the 'IK Constraints' tab in a software interface. The interface has a top navigation bar with tabs: 'Segments', 'Landmarks', 'Muscles', and 'Subject Data / Metrics'. Below this, there's a sub-navigation bar with 'Segments', 'Segment Properties', and 'IK Constraints' (which is highlighted with a red box). The main area contains several buttons: 'Default IK', 'Delete IK', 'Load IK', and 'Save IK'. Below these is a 'Linkage:' dropdown menu. Further down are buttons for 'New Chain', 'Delete Chain', and 'Rename Chain'. A section for 'Segment:' and 'Parent:' dropdowns is followed by 'Filter Frequency:' (set to 0) and 'Weight Factor:' (set to 1). Under 'Mobilizers (Degrees of Freedom):', there are checkboxes for 'X Trans', 'Y Trans', 'Z Trans', 'Rot 1', 'Rot 2', and 'Rot 3'. A 'Linkage Properties' button is on the left, and a 'Delete Linkage' button is on the right. Below these is a table with columns: 'Segment', 'Parent', 'Translations', and 'Rotations'. At the bottom, there's a checkbox 'Fit Subject Cal to IK Model' (checked) and a section 'Algorithm for Computing Pose' with a dropdown menu set to 'Inverse Kinematics'.

3. Click the *New Chain* button.



4. In the Create Linkage window type the name of the new linkage and click Okay.



5. You'll notice that the linkage you created shows up in the IK Constraints dialogue.

Segments | Landmarks | Muscles | Subject Data / Metrics

Segments | Segment Properties | IK Constraints

Default IK | Delete IK | Load IK | Save IK

Linkage: **LEGS**

New Chain | Delete Chain | Rename Chain

Segment: Filter Frequency:

Parent: Weight Factor:

Mobilizers (Degrees of Freedom):

☐ X Trans ☐ Y Trans ☐ Z Trans

☐ Rot 1 ☐ Rot 2 ☐ Rot 3

Linkage Properties Delete Linkage

Segment	Parent	Translations	Rotations

☒ Fit Subject Cal to IK Model

Algorithm for Computing Pose

6. Under *Segment* select *Pelvis*

Default IK | Delete IK | Load IK | Save IK

Linkage: **LEGS**

New Chain | Delete Chain | Rename Chain

Segment: **Pelvis** Filter Frequency:

Parent: **Pelvis** Weight Factor:

Mobilizers (D

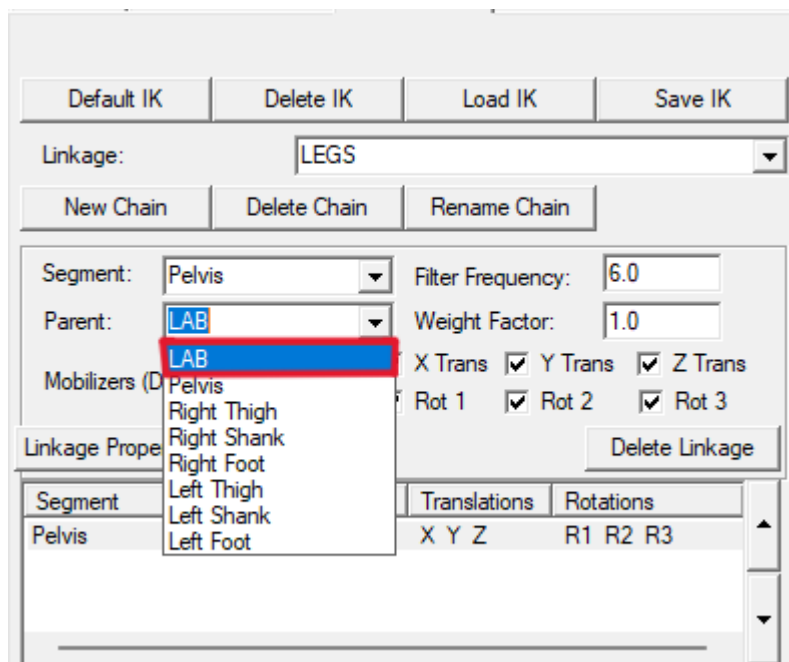
☒ X Trans ☒ Y Trans ☒ Z Trans

☒ Rot 1 ☒ Rot 2 ☒ Rot 3

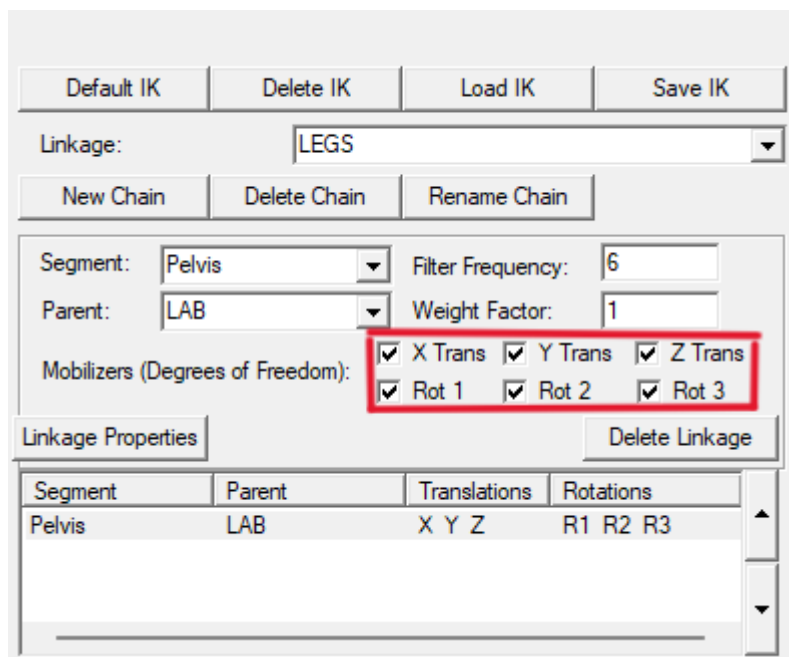
Linkage Properties Delete Linkage

Segment	Parent	Translations	Rotations
Pelvis	LAB	X Y Z	R1 R2 R3

7. Under *Parent* choose *LAB*



8. You want the pelvis to have all six degrees of freedom so make sure all of the boxes are checked.



9. The new constraint will automatically appear in the window below

Default IK Delete IK Load IK Save IK

Linkage: LEGS

New Chain Delete Chain Rename Chain

Segment: Pelvis Filter Frequency: 6

Parent: LAB Weight Factor: 1

Mobilizers (Degrees of Freedom): ☒ X Trans ☒ Y Trans ☒ Z Trans
☒ Rot 1 ☒ Rot 2 ☒ Rot 3

Linkage Properties Delete Linkage

Segment	Parent	Translations	Rotations
Pelvis	LAB	X Y Z	R1 R2 R3

10. Keep the *Linkage* the same but change the *Segment* to Right Thigh and the *Parent* to Pelvis.

Default IK Delete IK Load IK Save IK

Linkage: LEGS

New Chain Delete Chain Rename Chain

Segment: Right Thigh Filter Frequency: 6.0

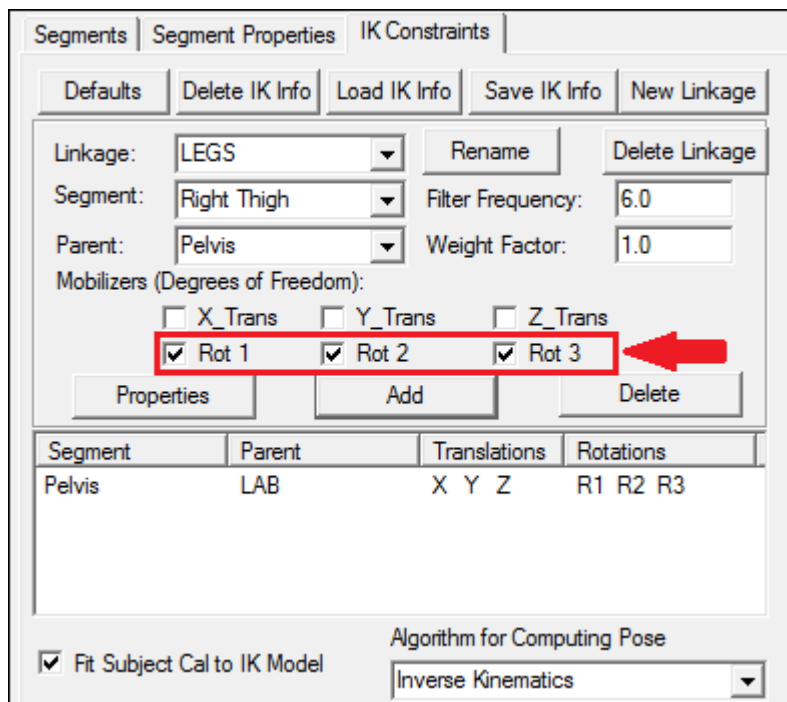
Parent: Pelvis Weight Factor: 1.0

Mobilizers (Degrees of Freedom): ☐ X Trans ☐ Y Trans ☐ Z Trans
☒ Rot 1 ☒ Rot 2 ☒ Rot 3

Linkage Properties Delete Linkage

Segment	Parent	Translations	Rotations
Pelvis	LAB	X Y Z	R1 R2 R3
Right Thigh	Pelvis	0 0 0	R1 R2 R3

11. Select only the bottom row of Mobilizers.



Segments | Segment Properties | IK Constraints

Defaults | Delete IK Info | Load IK Info | Save IK Info | New Linkage

Linkage: LEGS | Rename | Delete Linkage

Segment: Right Thigh | Filter Frequency: 6.0

Parent: Pelvis | Weight Factor: 1.0

Mobilizers (Degrees of Freedom):

☐ X_Trans ☐ Y_Trans ☐ Z_Trans

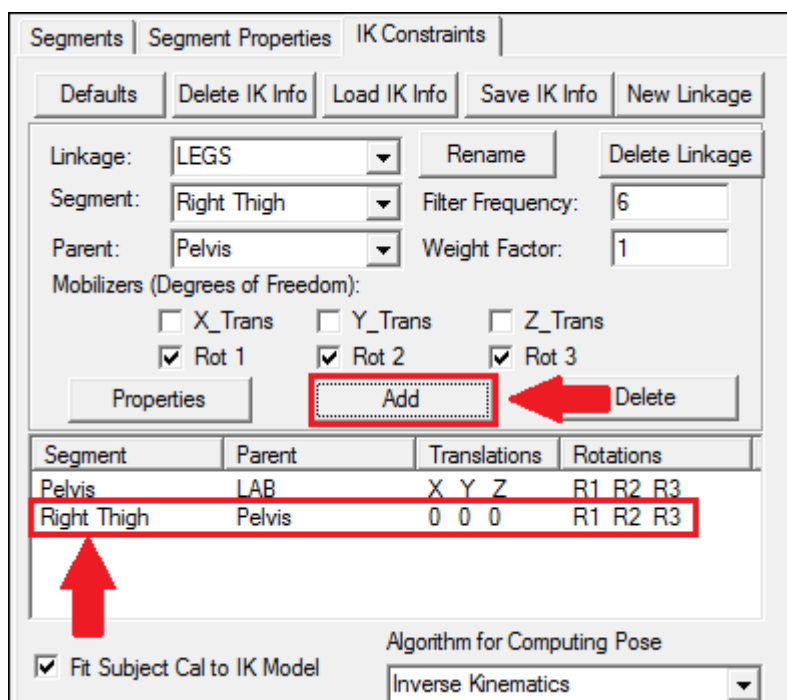
☒ Rot 1 ☒ Rot 2 ☒ Rot 3

Properties | Add | Delete

Segment	Parent	Translations	Rotations
		X Y Z	R1 R2 R3
Pelvis	LAB		

☒ Fit Subject Cal to IK Model | Algorithm for Computing Pose: Inverse Kinematics

12. Add the new constraint.



Segments | Segment Properties | IK Constraints

Defaults | Delete IK Info | Load IK Info | Save IK Info | New Linkage

Linkage: LEGS | Rename | Delete Linkage

Segment: Right Thigh | Filter Frequency: 6

Parent: Pelvis | Weight Factor: 1

Mobilizers (Degrees of Freedom):

☐ X_Trans ☐ Y_Trans ☐ Z_Trans

☒ Rot 1 ☒ Rot 2 ☒ Rot 3

Properties | Add | Delete

Segment	Parent	Translations	Rotations
		X Y Z	R1 R2 R3
Pelvis	LAB		
Right Thigh	Pelvis	0 0 0	R1 R2 R3

☒ Fit Subject Cal to IK Model | Algorithm for Computing Pose: Inverse Kinematics

13. Now set the *Segment* as Right Shank and the *Parent* as Right Thigh.

14. Add this constraint.

15. Set the *Segment* as Right Foot and the *Parent* as Right Shank

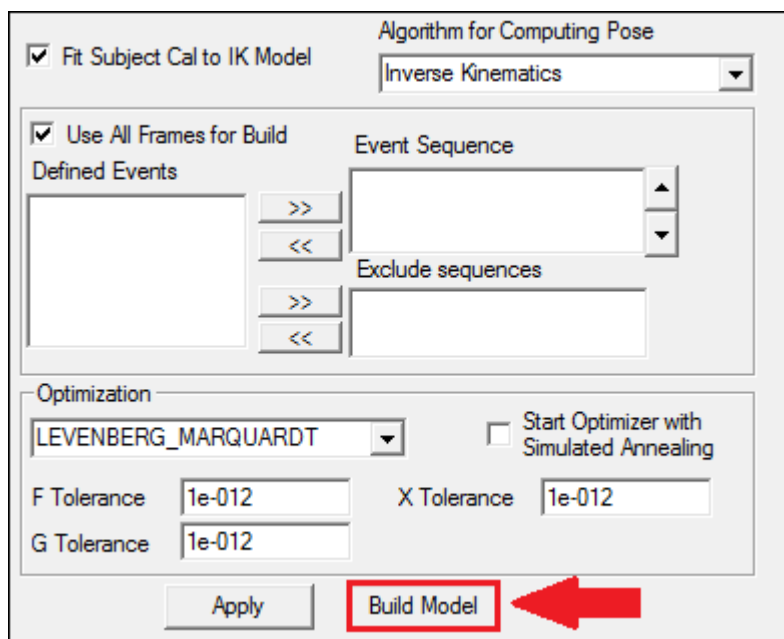
16. Add this constraint.

17. Set the *Segment* as Left Thigh and the *Parent* as Pelvis and add this constraint.

18. Set the *Segment* as Left Shank and the *Parent* as Left Thigh and add this constraint.

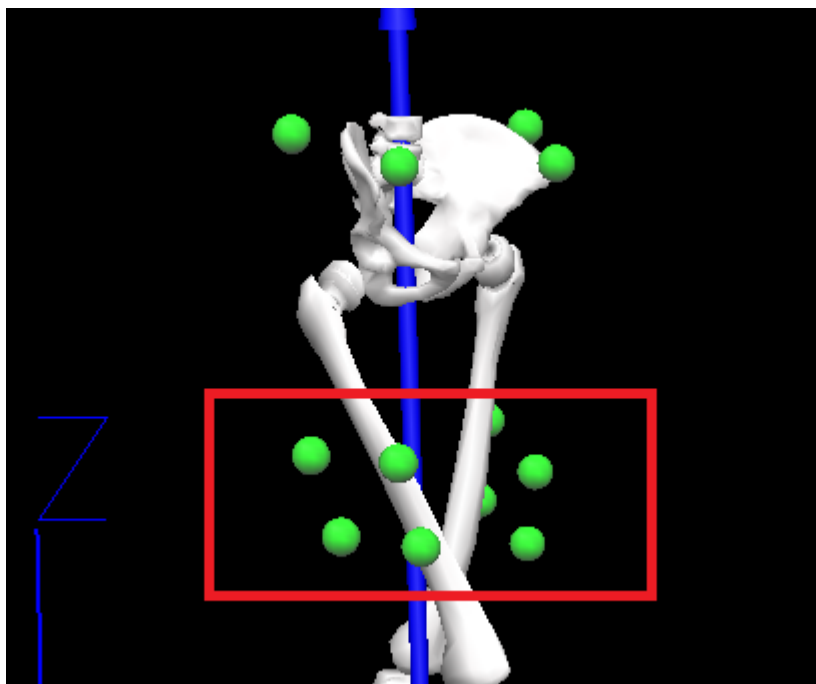
19. Set the *Segment* as Left Foot and the *Parent* as Left Shank and add this constraint.

20. Click the Build Model button



21. Your IK model has now been built

22. If your CMO has a motion file in it you will notice that building an IK Model will change the marker colour from white to green.



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