

Building an IK Model

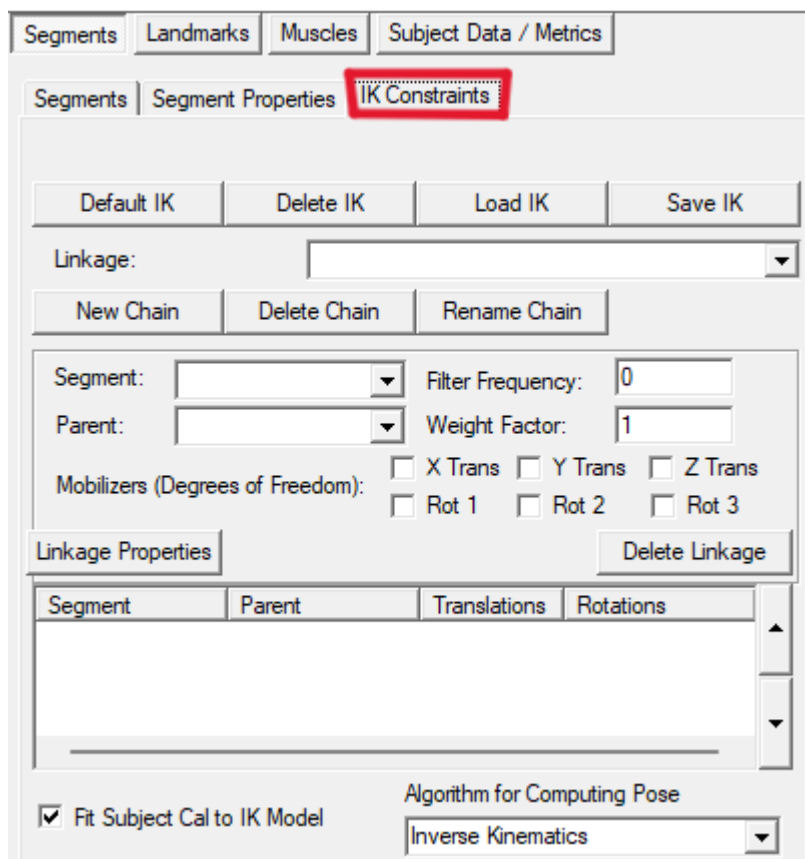
Introduction

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.

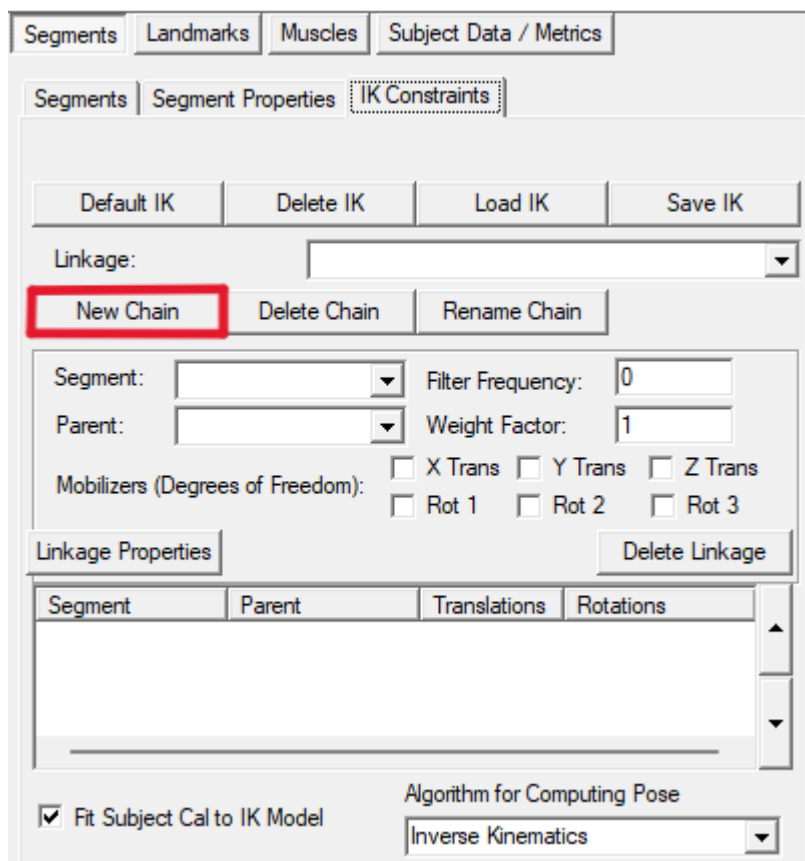
There is also a video tutorial available [here](#)

Tutorial

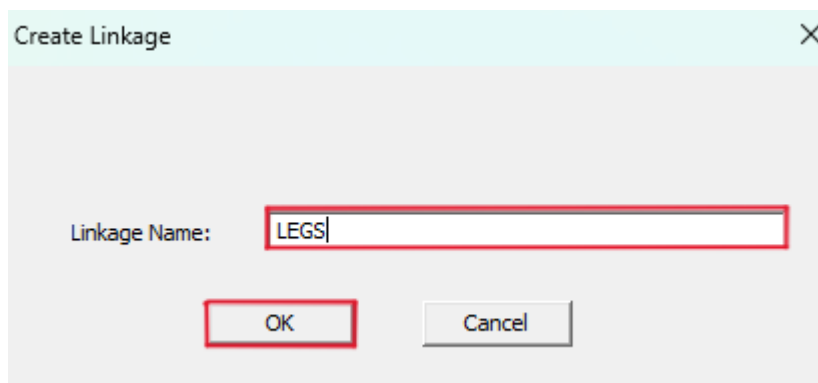
1. Open the file and go to the Models tab.
2. Under the Segments tab open the IK Constraints tab.



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:

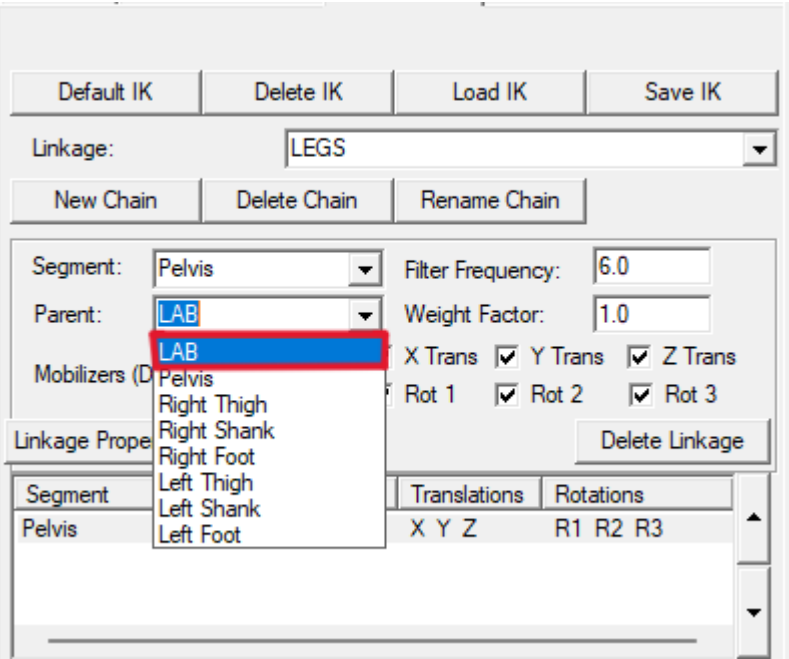
Parent: **Pelvis** Weight Factor:

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

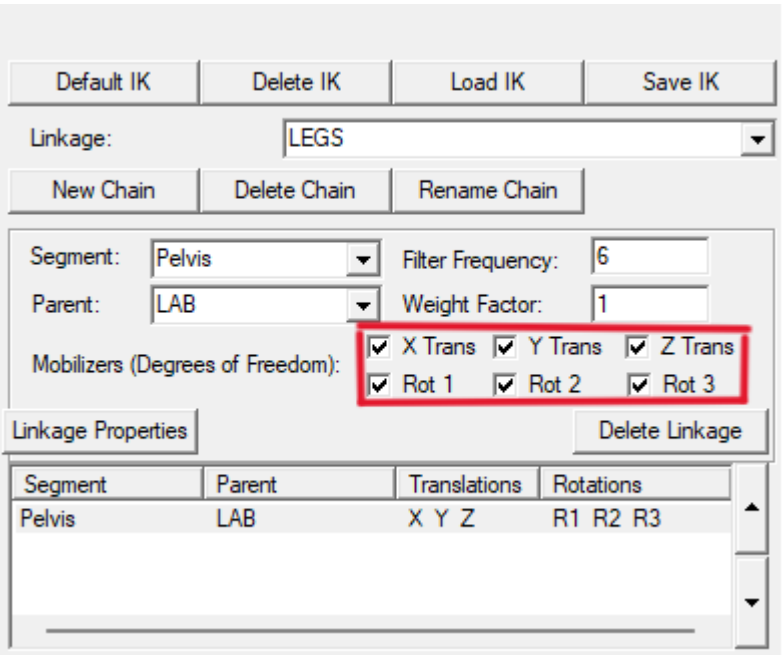
Linkage Properties Delete Linkage

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

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.

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

12. The new constraint will appear.

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

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

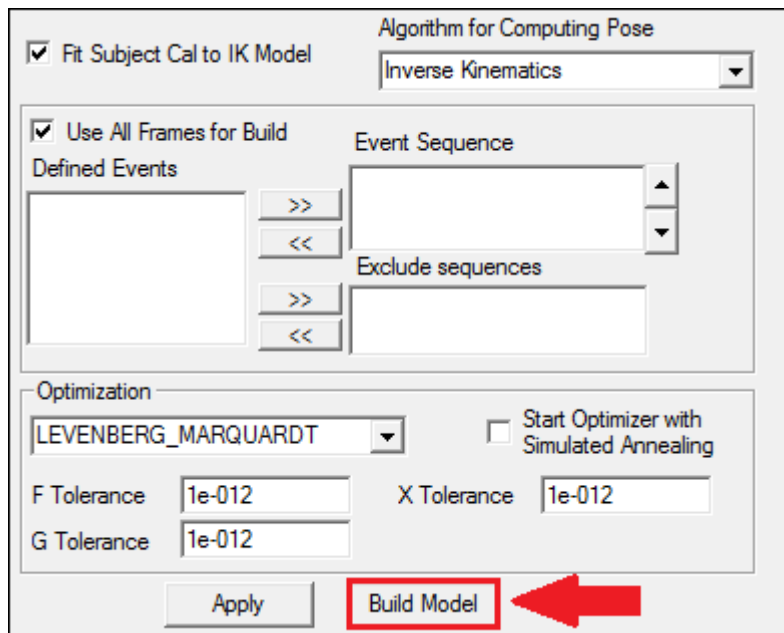
16. Add this constraint.

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



Algorithm for Computing Pose

☒ Fit Subject Cal to IK Model

Inverse Kinematics

☒ Use All Frames for Build

Defined Events

Event Sequence

Exclude sequences

Optimization

LEVENBERG_MARQUARDT

☐ Start Optimizer with Simulated Annealing

F Tolerance: 1e-012

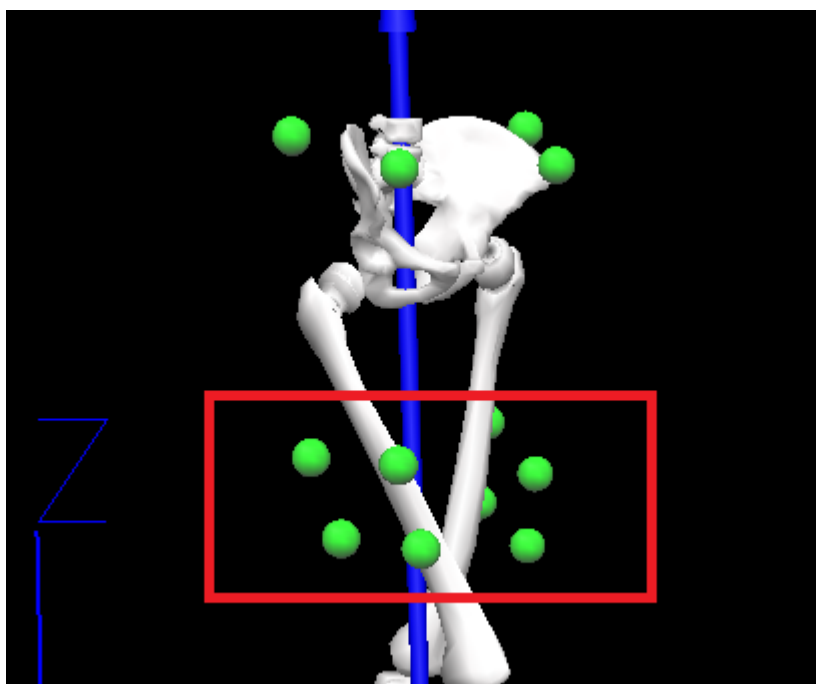
X Tolerance: 1e-012

G Tolerance: 1e-012

Apply Build Model

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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