

Building an IK Model

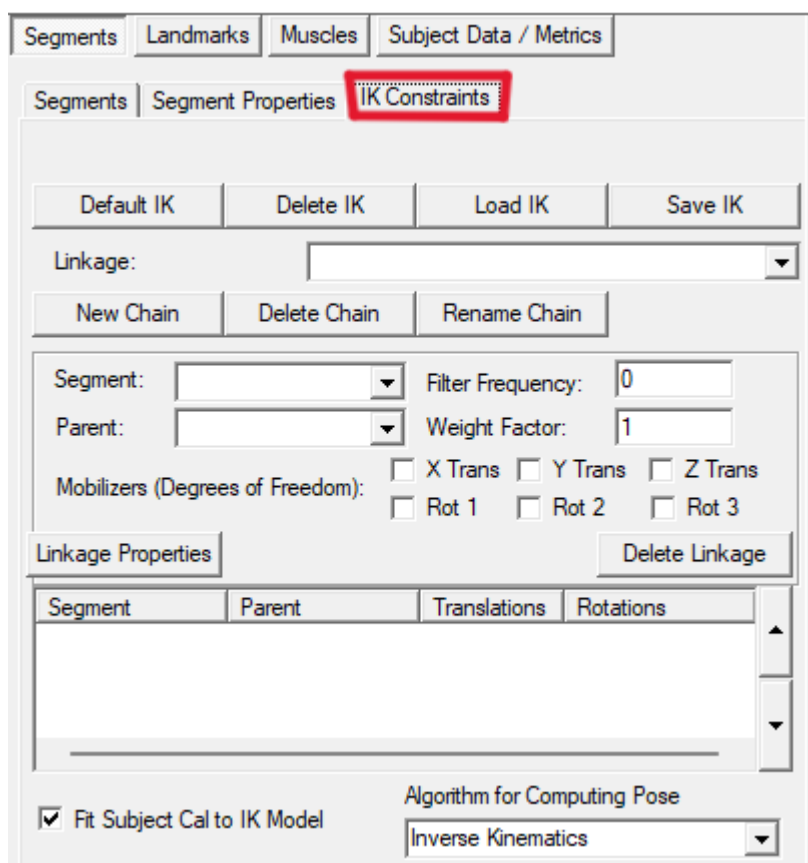
Introduction

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.

Segments | Landmarks | Muscles | Subject Data / Metrics

Segments | Segment Properties | **IK Constraints**

Default IK | Delete IK | Load IK | Save IK

Linkage:

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
Inverse Kinematics

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**

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

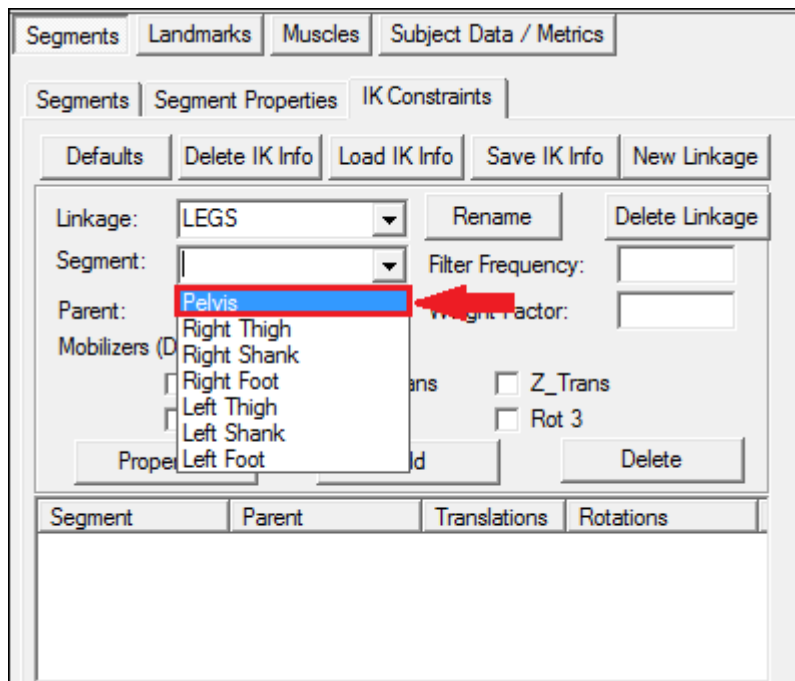
Linkage: **LEGS** Delete Linkage

Segment: Filter Frequency:
 Parent: Weight Factor:
 Mobilizers (Degrees of Freedom):
☐ X_Trans ☐ Y_Trans ☐ Z_Trans
☐ Rot 1 ☐ Rot 2 ☐ Rot 3

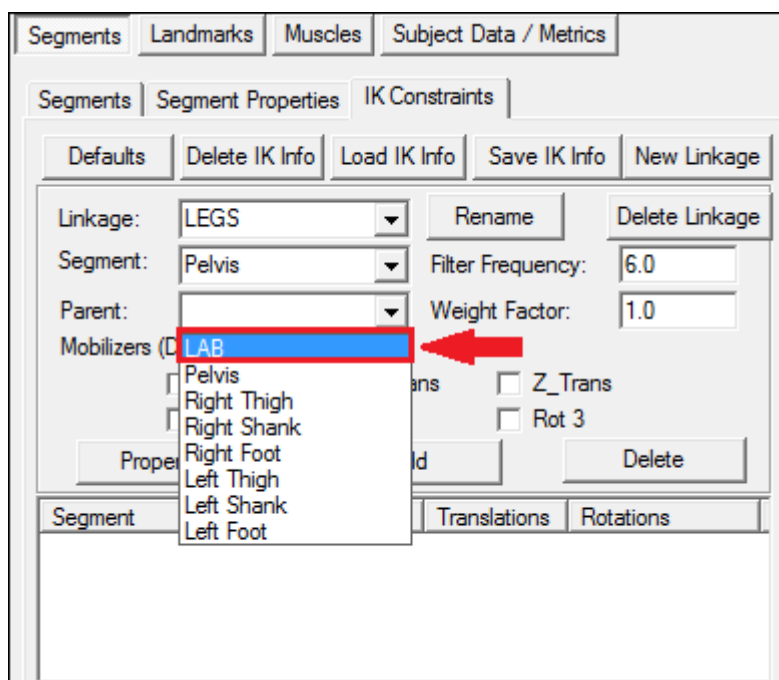
Properties Add Delete

Segment	Parent	Translations	Rotations

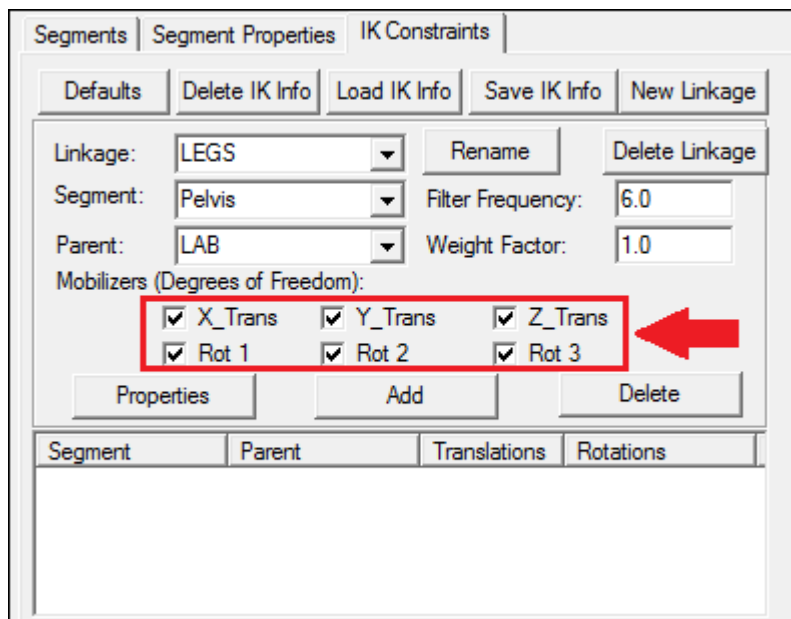
6. Under *Segment* select *Pelvis*



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.



Segments | Segment Properties | IK Constraints

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

Linkage: LEGS | Rename | Delete Linkage

Segment: Pelvis | Filter Frequency: 6.0

Parent: LAB | Weight Factor: 1.0

Mobilizers (Degrees of Freedom):

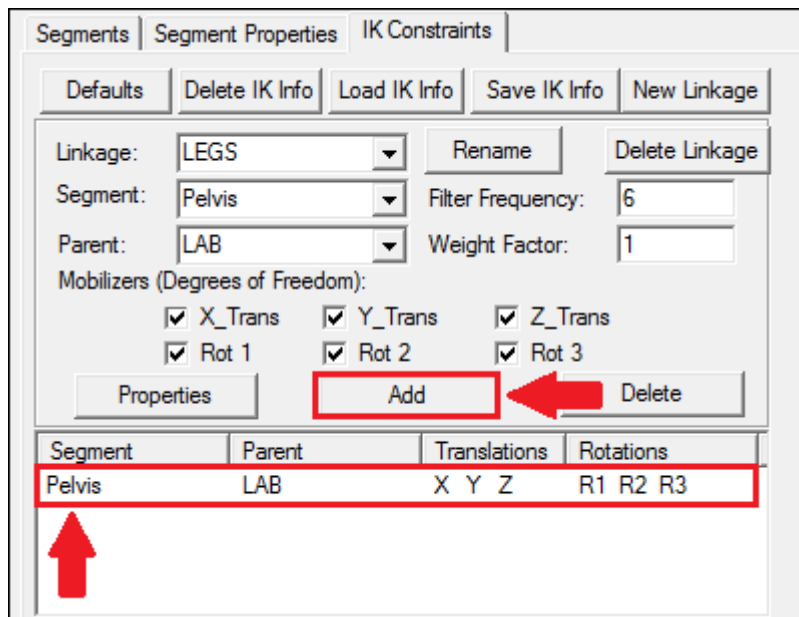
☒ X_Trans ☒ Y_Trans ☒ Z_Trans

☒ Rot 1 ☒ Rot 2 ☒ Rot 3

Properties | Add | Delete

Segment	Parent	Translations	Rotations
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9. Click *Add* and the new constraint will appear in the window below



Segments | Segment Properties | IK Constraints

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

Linkage: LEGS | Rename | Delete Linkage

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

Properties | Add | Delete

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.

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
Pelvis	LAB	X Y Z	R1 R2 R3

☒ Fit Subject Cal to IK Model

Algorithm for Computing Pose: Inverse Kinematics

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

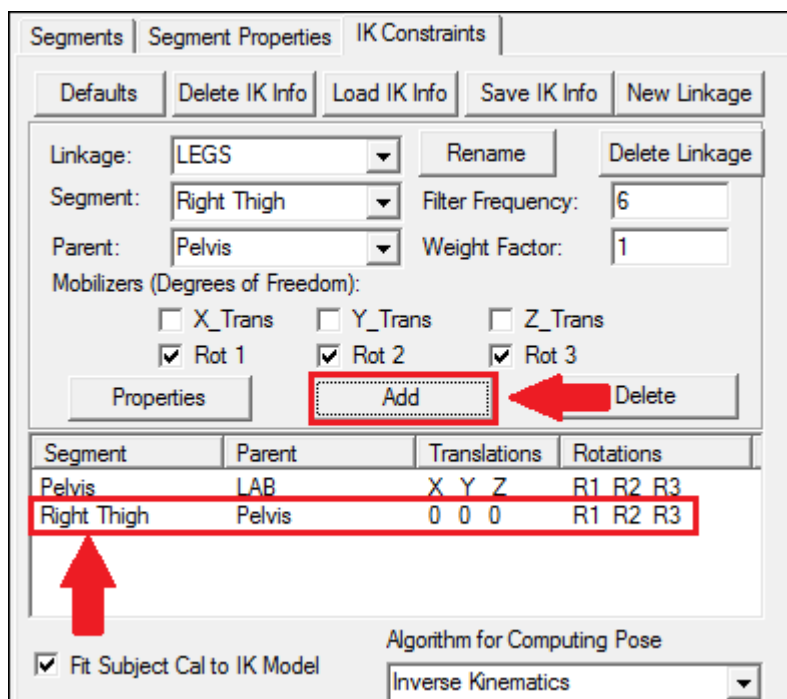
Properties | Add | Delete

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

☒ 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
Pelvis	LAB	X Y Z	R1 R2 R3
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

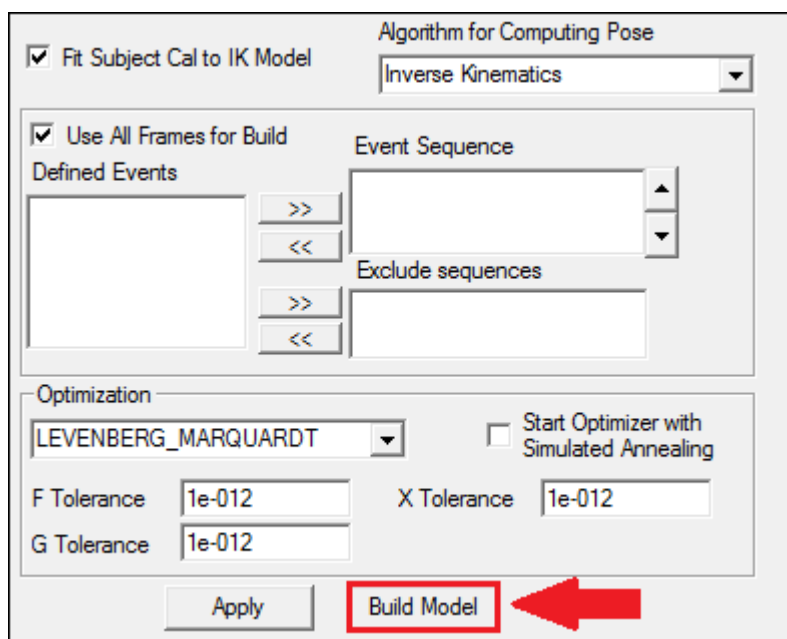
16. Add this constraint.

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



☒ Fit Subject Cal to IK Model

Algorithm for Computing Pose: 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

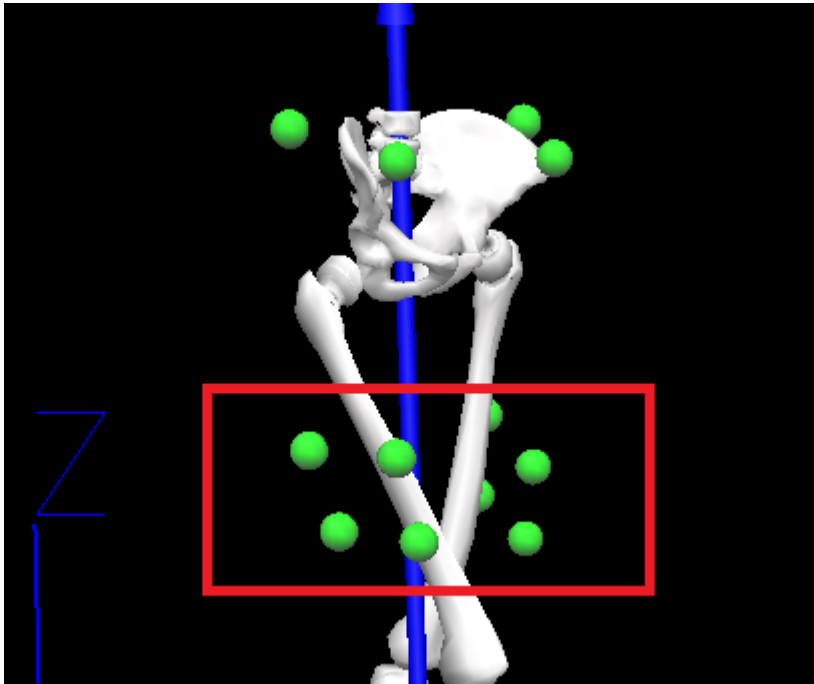
G Tolerance: 1e-012

X 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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