

# Building an IK Model

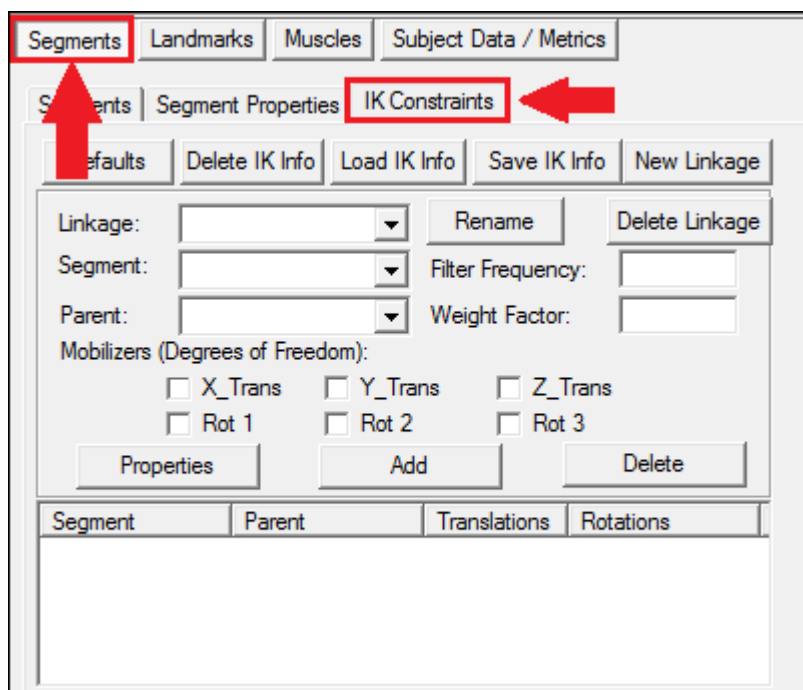
## Introduction

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.

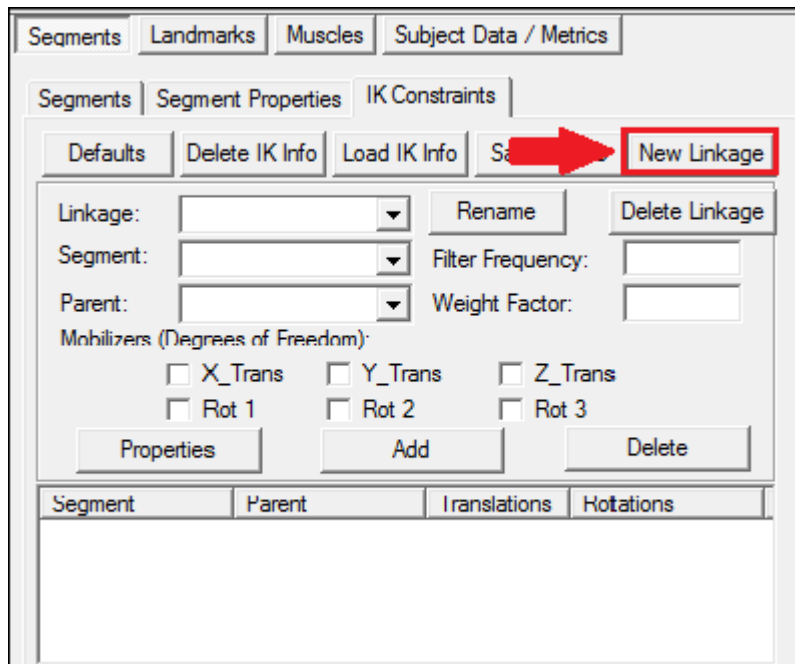
There is also a video tutorial available [here](#)

## Tutorial

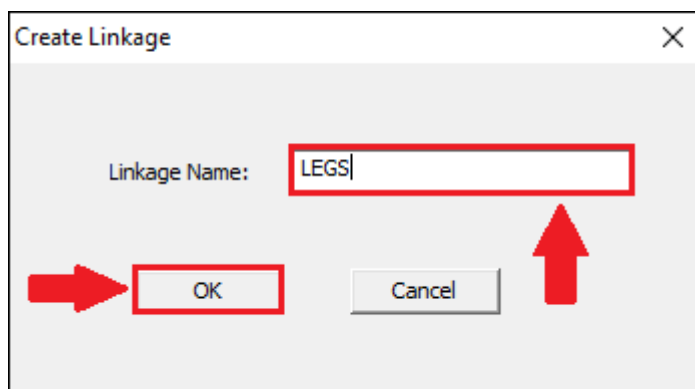
1. Open the file and go to the Models tab.
2. Under the Segments tab open the IK Constraints tab.



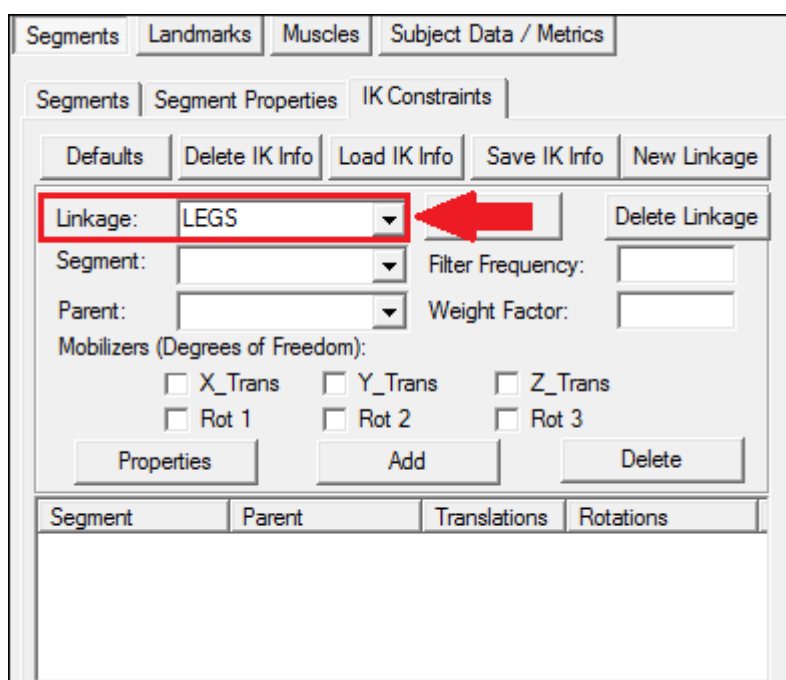
3. Click the *New Linkage* button.



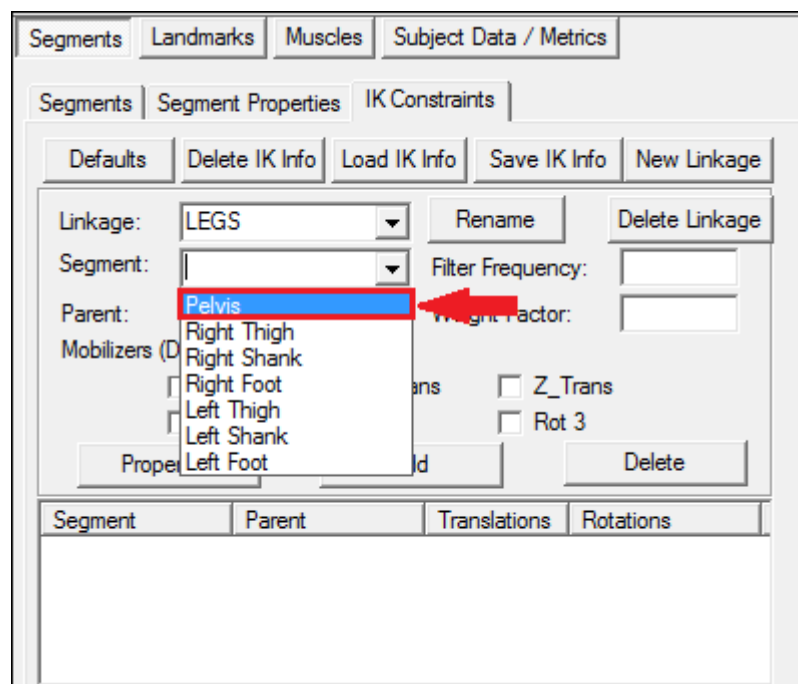
4. In the Create Linkage window type the name of the new linkage and click Okay.



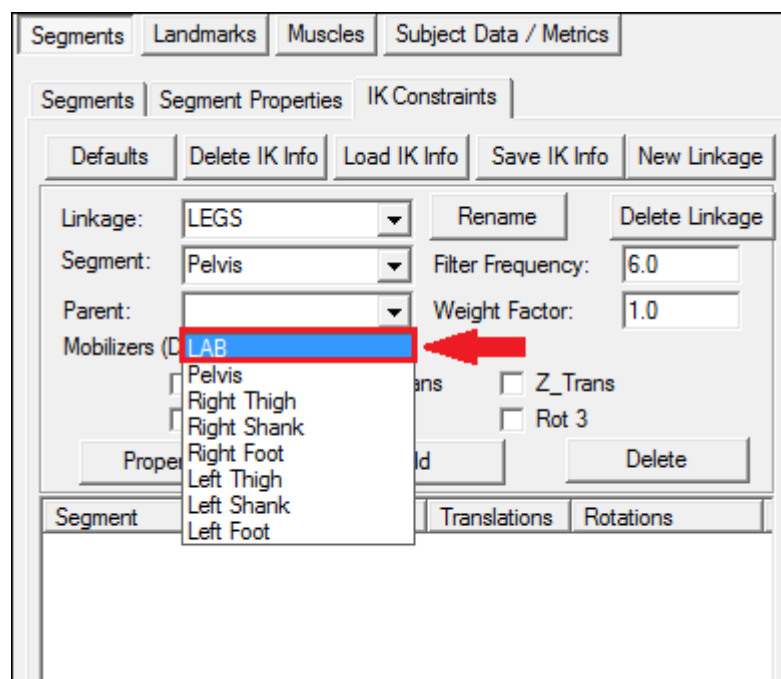
5. You'll notice that the linkage you created shows up in the IK Constraints dialogue.



## 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 |
|---------|--------|--------------|-----------|
|---------|--------|--------------|-----------|

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

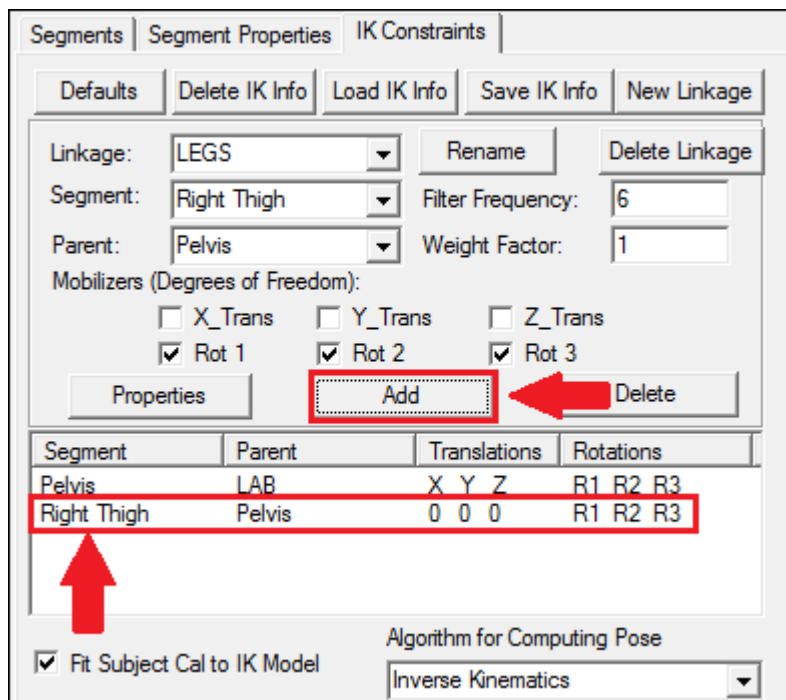
Properties | Add | Delete

| 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

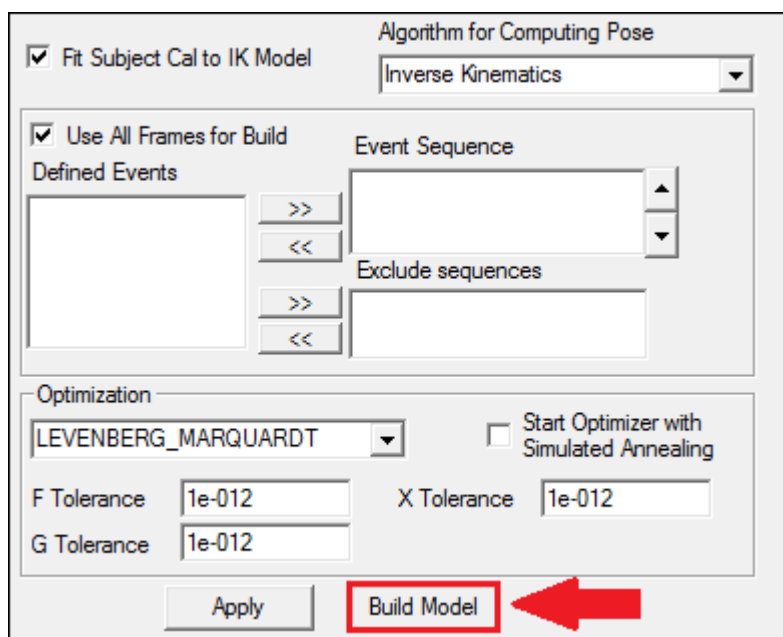
16. Add this constraint.

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

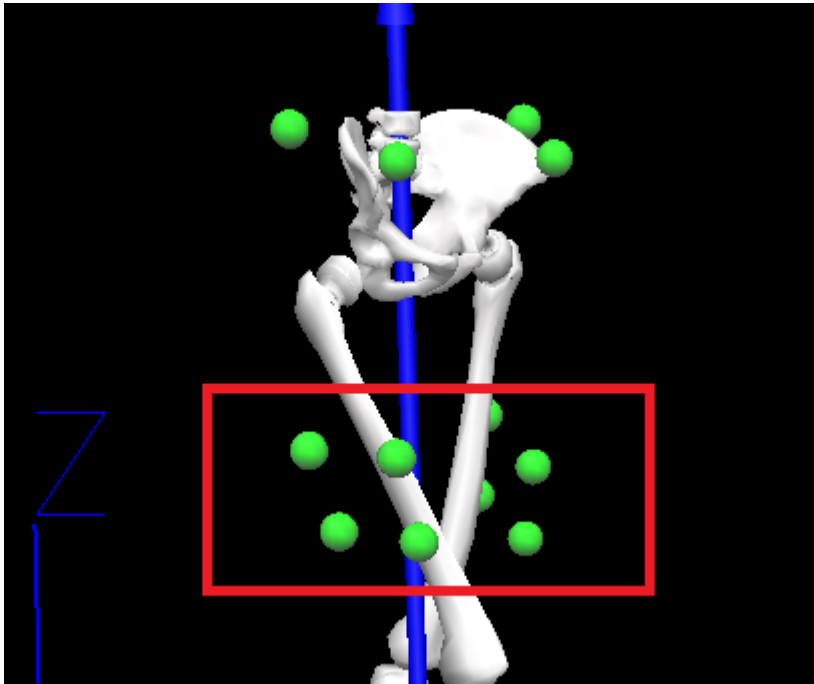
G Tolerance: 1e-012

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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