ANSWER SHEET
OpenSim Tutorial #3
Scaling, Inverse Kinematics, and Inverse Dynamics

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Questions

1. *Based on information in the Scale Tool dialog, what is the mass of the generic musculoskeletal model? What was the mass of the subject?*

2. To see the loaded scale factors, click on the **Scale Factors** tab. *Which body segments were scaled manually?*

3. *Based on information in the Inverse Kinematics Tool dialog, at what frequency was the experimental motion data captured?*
   Hint: *Look for the box titled Marker Data.*

4. Click the **Weights** tab and scroll through the list of markers in the top half of the dialog. *Which markers have weighting values less than one? Why?*
   Hint: *Think about joints that have not been modeled.*

5. *Based on information in the Messages window, what is the root-mean-squared (RMS) error of all the markers in the last frame of the motion? Does this seem reasonable? Explain.*

6. *Which marker had the maximum error in the last frame, and what was the value? Why?*
    Hint: Think about the weighted least squares problem.

7. *What was the maximum coordinate (joint angle) error? Is it significant?*

8. *On your plot of the ankle moments, identify when heel strike, stance phase, toe off, and swing phase occur for each curve (i.e., left leg and right leg).*

9. *Based on your plot and the angle convention for the ankle, give an explanation of what is happening at the ankle just before toe-off.*
    Hint: It may be useful to use the Coordinate sliders to understand the angle convention for the ankle.

10. *What are the maximum magnitudes of the residual forces? Using the mass of the subject from Question 1, what fraction of body weight are the maximum residual forces?*