**CTE Helmet Testing Analysis Group:**

**Part I: Linear Acceleration**

Open one of the Graphical Analysis 4 graphs saved in your shared folder.

Because we do not know the precise orientation of the accelerometer when the helmet struck the floor, we will use a simplified net acceleration in three dimensions:

For linear motion, we will use the Head Impact Criterion (HIC) method to determine the severity of the impact. Our sensors are impressive tools; however, they are not designed for the very fast, very sensitive data HIC requires. Your values are approximations.

Where:

We will tackle this relationship in pieces.

1. Zoom in on the acceleration spike in the graph.
   1. Highlight the general region of the acceleration spike.
   2. If you have Zoom to Selection available in the bottom left corner, click it.
   3. If you do not have Zoom to Selection available, click Graph Tools.
   4. Click Edit Graph Options.
   5. Adjust the x-axis and y-axis range until you can see the spike clearly.
2. Click on your graph to use the Examine tool.
3. Drag the tool to the left foot of the acceleration spike. This will be t1.
4. Drag the tool to the first peak of the acceleration spike. It should be the highest. This will be t2.
5. Close the Examine tool.
6. Highlight the region between t1 and t2.
7. Click Graph Tools and View Integral. Divide this value by 9.81 m/s2 to compute the acceleration in terms of *g*. This new value will replace .
8. Calculate HIC using this information.

**Part II: Rotational Motion**

Because we do not have any true rotational accelerometers, we will use rotational velocity data to estimate. The device you used measured rotation in radians per second.

The bottom graph shows rotational velocity vs. time for each of the three axes.

For rotational motion, we will use the Brain Injury Criterion (BrIC) method to determine the severity of the angular acceleration. The coefficients were determined using specific models of test dummies. We will borrow those values with the understanding that our experiment is an approximation.

Where:

1. Click on your graph to use the Examine tool.
2. Drag the tool to find the peak rotational velocity for each axis.
3. Calculate BrIC using this information.