

# **Quintic Software**

## **Tutorial 8b**

Single Video Analysis

**V35**

# Contents Page

---

## 1. Analysis Systems

## 2. Single Video Linear Analysis

- a. Functions
- b. File
- c. Units
- d. Frames/Page
- e. Display
- f. Origin
- g. Save Excel
- h. Settings



## 3. Single Video Angular Analysis

- a. Functions
- b. File
- c. Units
- d. Frames/Page
- e. Display
- f. Save Excel
- g. Settings

## 4. Live Data Table



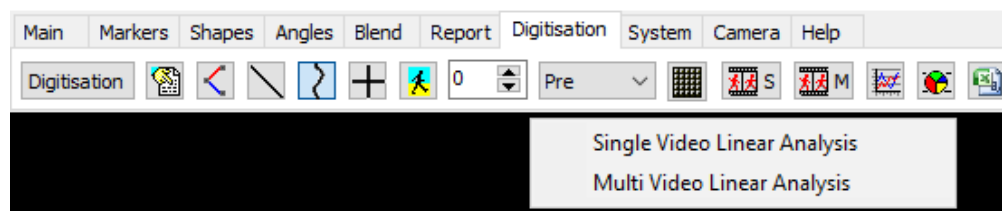
## 1) Analysis Systems

Quintic allows the user to analyse the digitised movement. These values are automatically calculated for you and can be viewed in graphical form by pressing either the Linear Analysis  or the Angular Analysis  buttons.

From this you can then select Single Video Analysis or Multi Video Analysis.

### Linear Analysis

Click on the Linear Analysis button, then either select '**Single Video Linear Analysis**' or '**Multi Video Linear Analysis**' (this is covered in Tutorial 8C).



Linear analysis will provide data on the Distance, Velocity and Acceleration of the points that have digitised.

### Angular Analysis

Click on the Angular Analysis button, then either select 'Single Video Angular Analysis' or 'Multi Video Angular Analysis' (this is covered in Tutorial 8C).

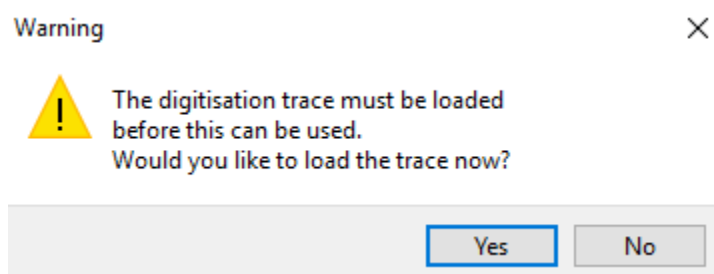


Angular Analysis will provide data on Angular Displacement, Angular Velocity and Angular Acceleration of the points that have been digitised.

## 2) Single Video Linear Analysis

Once the video has been digitised and the trace has been loaded, simply click on the **'Single Video Linear Analysis'** option after the Linear Analysis button has been pressed.

If the digitisation trace has not been loaded on the video, the following pop up will appear, asking you to load the digitisation trace. Please click **'Yes'**.



Once the digitisation trace is loaded and the **'Single Video Linear Analysis'** button has been pressed, the Single Video Linear analysis window will load.

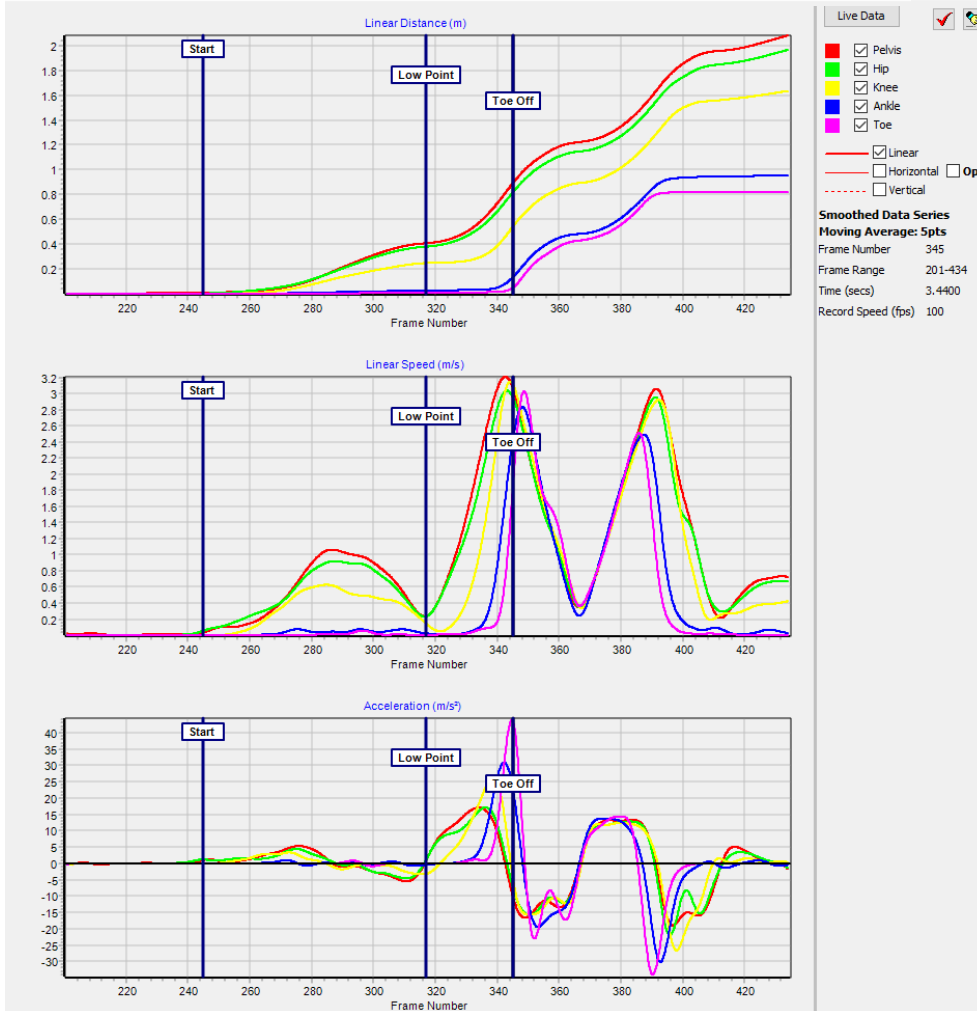
This will display the Distance, Velocity and Acceleration in 3 different graphs, for the points that have been digitised throughout the video.

If there are any Time Event Markers (please see Tutorial 2 for further information) that have been saved with the current video, they will also be displayed onto all 3 graphs. This will allow the user to quickly identify on the graph the key events of interest to them (e.g. Impact, Low Point, Toe Off etc). The Time Event Markers will be displayed on the graphs by a blue line, with the default name of Marker 1, Marker 2, if the Time Event Markers have not been named, or the relevant name of that marker if they have been named.

Any Interpolation Markers that have been added to the digitisation trace and saved, will also be shown on the graphs. These are shown with a burgundy line on the graphs.

Please see below an example of the Single Video Analysis Window within Quintic Biomechanics v35 software.

File Units Frames/Page Display Origin Save Excel Settings



Select which digitised markers you want to display on the graph by ticking/unticking the relevant boxes.

Select linear, horizontal or vertical values by ticking the relevant box. These values will then also be displayed on the corresponding graphs. Users are also able to 'opposite' the horizontal direction of the trace.

Digitisation Trace Information. Please see below for further information

**Data Series Type** – Either smoothed or raw data. In this example smoothing parameters have been applied to the trace.

**Frame Number** – This displays the current frame number of the associated video.

**Time** – This displays the current time of the associated video.

## Smoothed Data Series

**Moving Average: 5pts**

Frame Number 1

Frame Range 222-501

Time (secs) 0.0000

Record Speed (fps) 100

**Moving Average** – This displays the moving average that is applied to the data. Please see the heading 'Moving Average' below for more information.

**Frame Range** – This displays the digitisation range for the associated video. The digitisation trace starts on the first number and ends on the second number.

**Record Speed** – Calibrated frames per second of the associated video.

Live Data Table – This button will pop open the Live Data table, which allows the user to easily identify data values at specific points of interest, throughout the video. Please see the heading 'Live Data Table' below for more information.



Deselect All – When pressed, this will hide all of the digitised points on the associated graphs.

Select All – When pressed, this will show all of the digitised points on the associated graphs.

☒ Pelvis  
☒ Hip  
☒ Knee  
☒ Ankle  
☒ 5 Met

☒ Linear  
☐ Horizontal ☐ Opp  
☐ Vertical

**Smoothed Data Series**  
**Moving Average: 5pts**  
 Frame Number 1  
 Frame Range 222-501  
 Time (secs) 0.0000  
 Record Speed (fps) 100

Point Names and relevant digitisation trace information are coloured red when the associated video is outside of the digitisation range in the associated Quintic playback window.

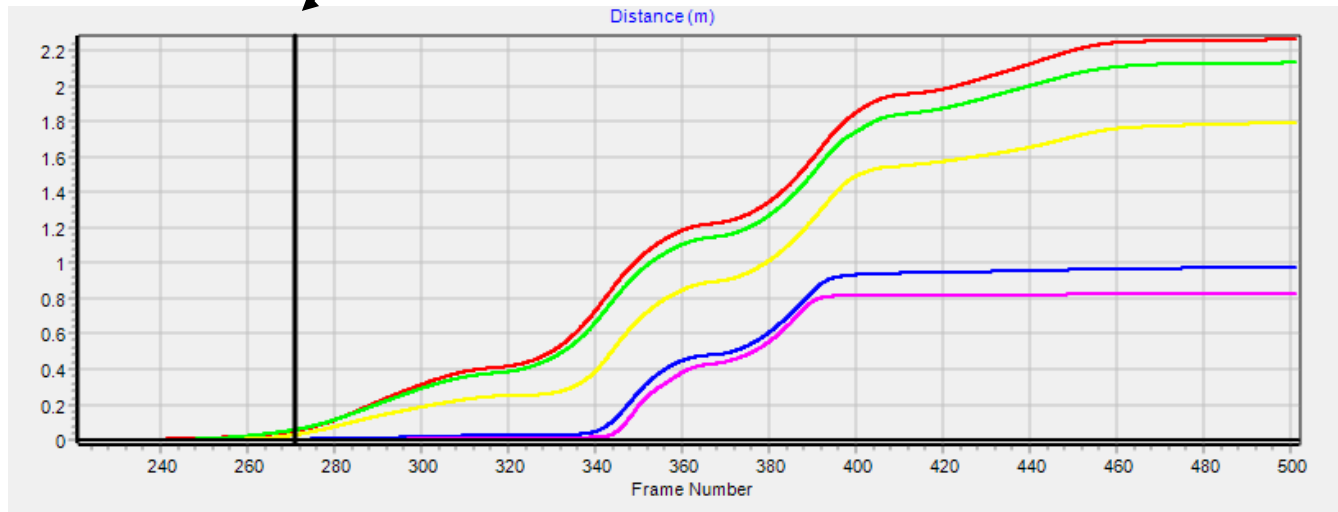
☒ Pelvis  
☒ Hip  
☒ Knee  
☒ Ankle  
☒ 5 Met

☒ Linear  
☐ Horizontal ☐ Opp  
☐ Vertical

**Smoothed Data Series**  
**Moving Average: 5pts**  
 Frame Number 241  
 Frame Range 222-501  
 Time (secs) 2.4000  
 Record Speed (fps) 100

Point Names and relevant digitisation trace information are coloured black when the associated video is within the digitisation range in the associated Quintic playback window.

Both the video and analysis windows are synchronised, therefore if the video is played / scrolled while the separate analysis window is open, a black line indicates the current video frame.



## a. Functions

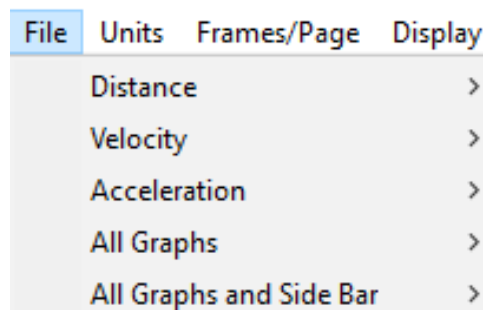
Within the Single Video Linear Analysis window there are a range of options which the user is able to select, which directly effects the distance, velocity and acceleration graphs.

The functions are available at the top of the Single Video Linear Analysis Window and are as follows:

**File   Units   Frames/Page   Display   Origin   Save Excel   Settings**

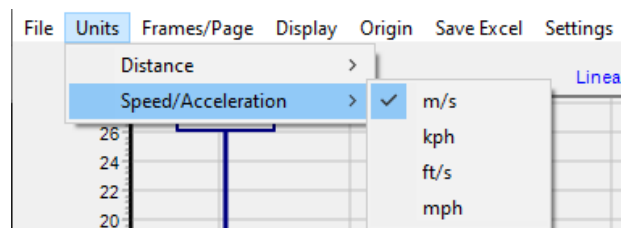
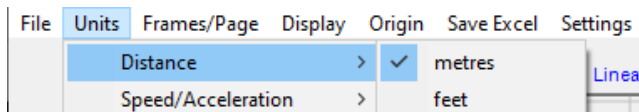
## b. File

Within the File menu, the user is able to Print, Print Preview, Save as JPEG or Copy to Clipboard for the individual Distance, Velocity and Acceleration graphs. The user is also able to Print, Save as JPEG or Copy to Clipboard the Distance, Velocity and Acceleration Graphs with or without the side bar as one image.



## c. Units

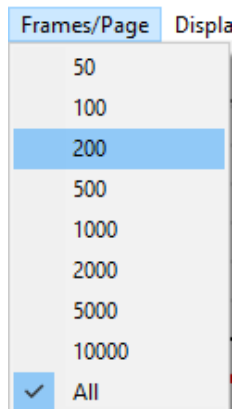
Within the Units menu, the user can change the units for the Distance and Speed/Acceleration graphs. The Distance options are Metres or Feet. The Speed/Acceleration options are as follows: Metres/Second, Kilometres per hour, Feet/Second or Miles per hour.



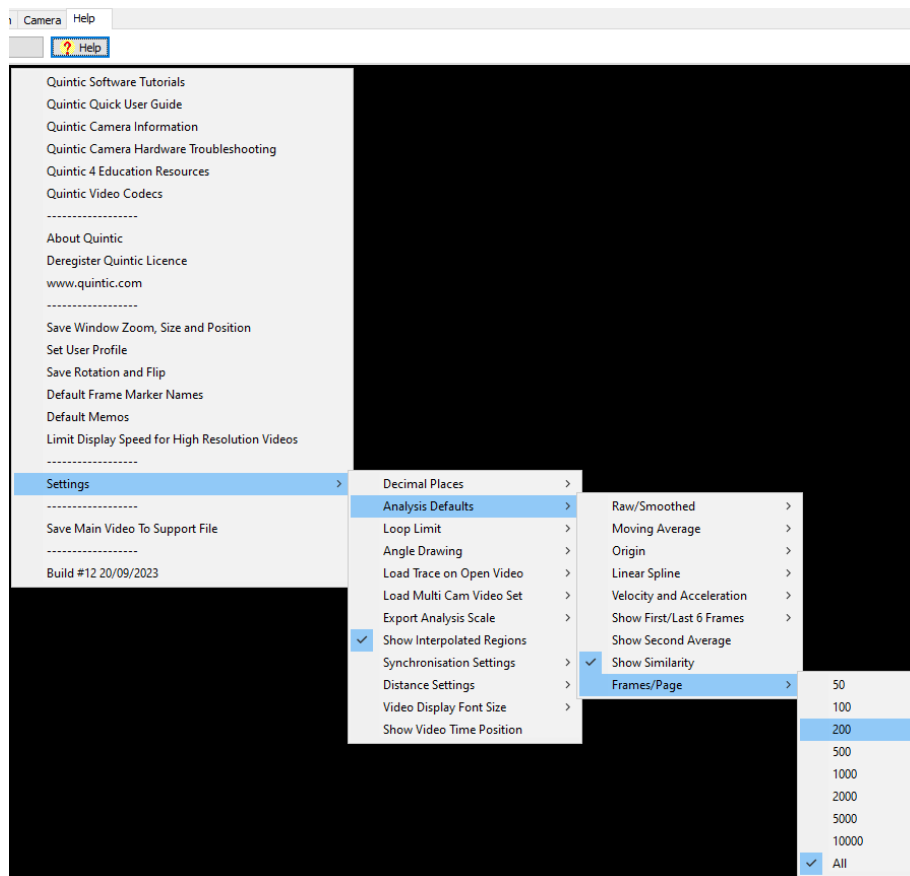


#### d. Frames/Page

Within the Frames/Page menu, the user is able to select how many frames are displayed on the graphs within the analysis window. This is ideal for users who have long digitisation traces.

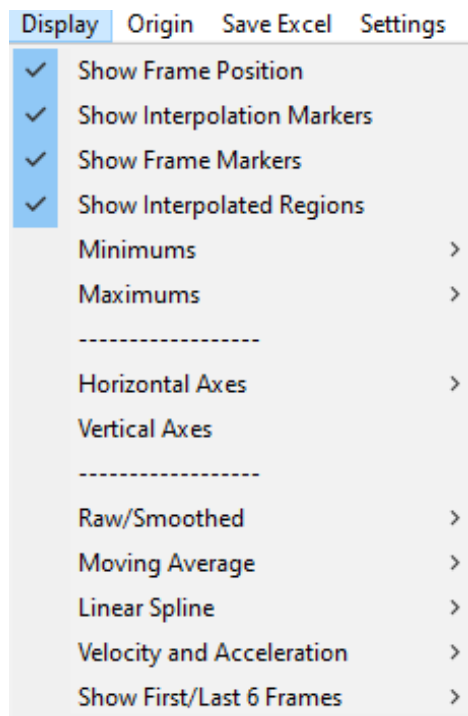


As default, the analysis windows will display all of the points on the graphs. Should users want to change this, they are able to do this by going to the Help tab within the main Quintic software. To do this, click the 'Help' button, then Settings, Analysis Defaults, Frames/Page and then select your preferred option. This will apply to all analysis windows.



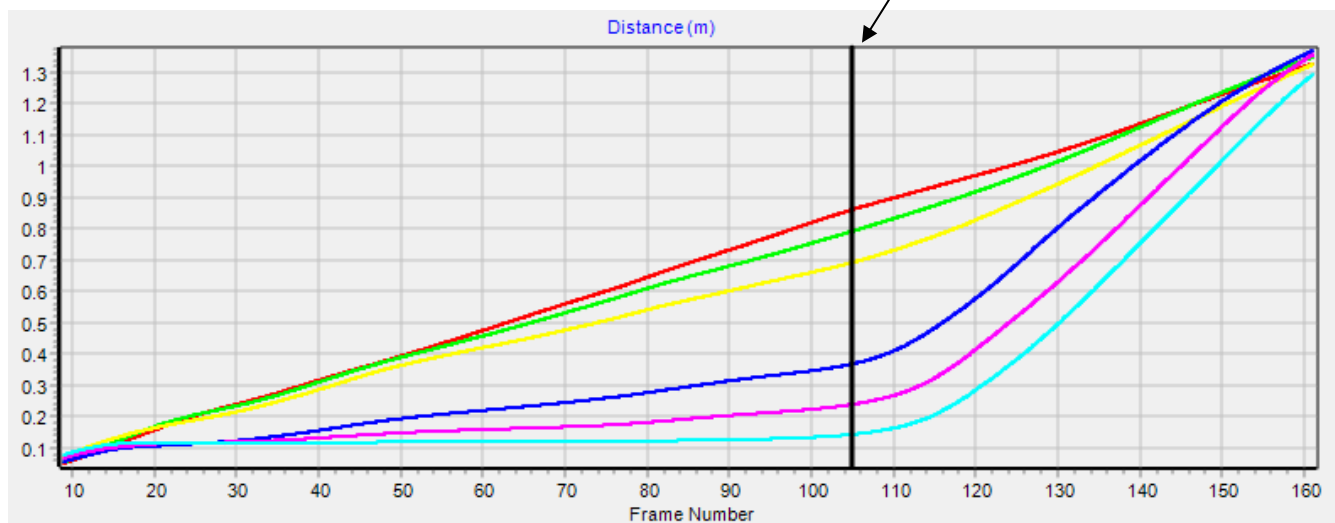
## e. Display

Within the Display menu, the user is able to adjust certain display settings which affect the Distance, Velocity and Acceleration graphs.



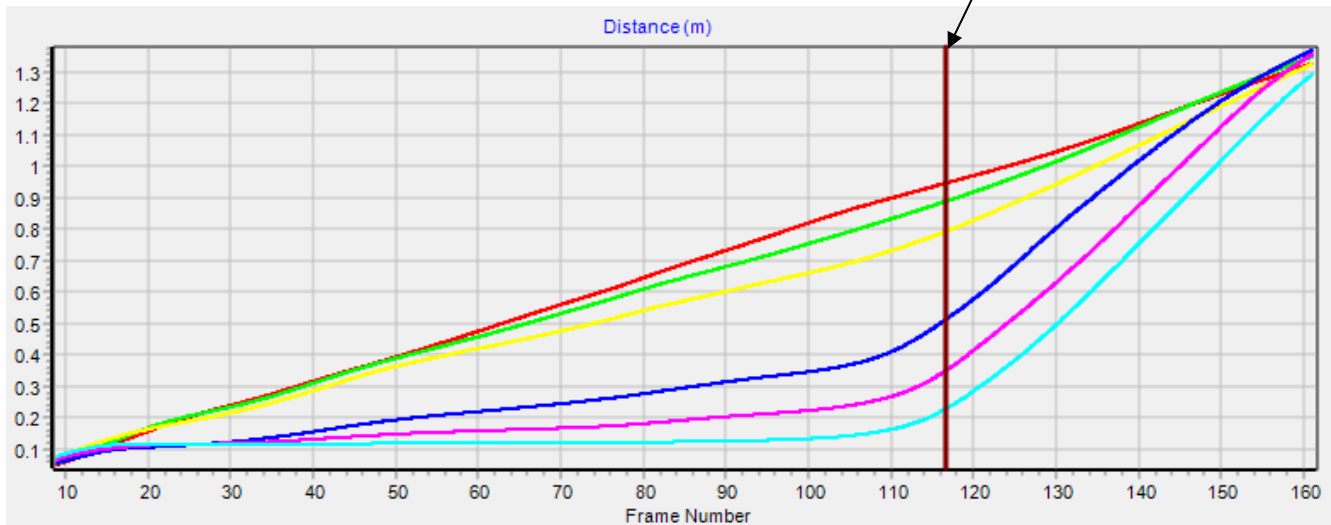
**Show Frame Position** – Ticking and Unticking the Show Frame Position (Default – Ticked/On) will show or hide the black line which shows the current frame position in relation to the current frame position in the associated Quintic window.

Show Frame Position ON:



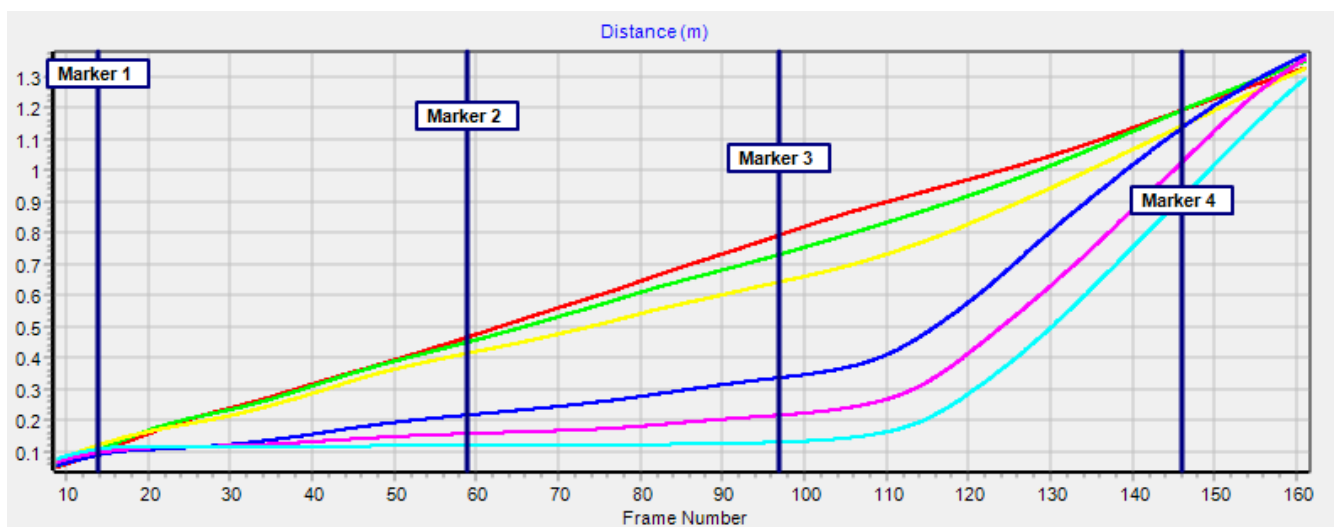
**Show Interpolation Markers** – Ticking and Unticking the Show Interpolation Markers (Default – Ticked/On) will show or hide any Interpolation markers which are saved with the associated digitisation trace. They will be shown on the graph by a burgundy line(s).

Show Interpolation Markers ON:



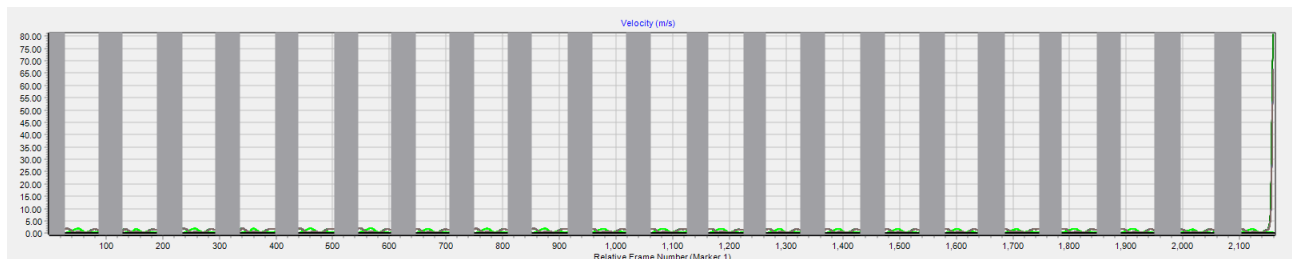
**Show Frame Markers** – Ticking and Unticking the Show Frame Markers (Default – Ticked/On) will show or hide any frame (Key Event) markers if there are any saved and within the digitisation range. They will be shown on the graph by blue line(s) and will either say Marker 1, Marker 2 etc if they have not been named or the relevant names if they have been named.

Show Frame Markers ON:



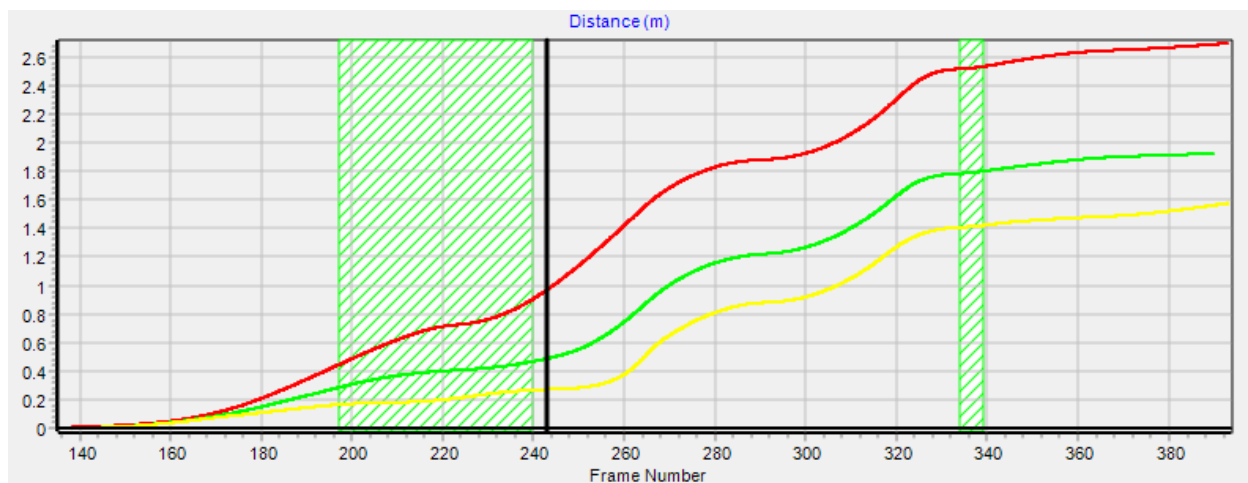
**Show Interpolated Regions (Intelligent)** – Ticking and Unticking the Show Interpolated Regions (Intelligent) will show or hide any regions where the reflective markers were lost or occluded and the marker(s) were interpolated. When analysing trial data in Quintic, the regions where interpolation has occurred are shown using different colours of box and hatching:

**Solid Grey Box** – This occurs when the whole reference template has been lost from the Area of Interest (AOI). The solid grey box appears on the graph between the frame where the template was completely lost and the frame where the whole template was re-found. The data series in this region is obscured from view.



**Coloured Hatching** – Covers the region of the graph where a single marker has been lost. The colour of the box is dependent on the colour of the marker selected when creating the reference model.

Interpolated Regions ON:

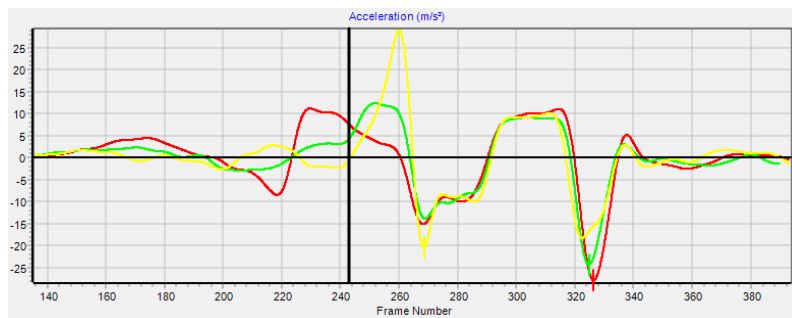


When using Single Angular Analysis hatching will only be displayed when the selected angle includes the marker that has been interpolated. E.g. When analysing the knee angular velocity during a gait analysis, regions where the hip marker has been interpolated, the hatchings will be displayed. However, in order to show interpolated regions, all videos must be digitised using the Intelligent Digitisation function in Quintic Coaching or Biomechanics v29/v31/v33/v35.

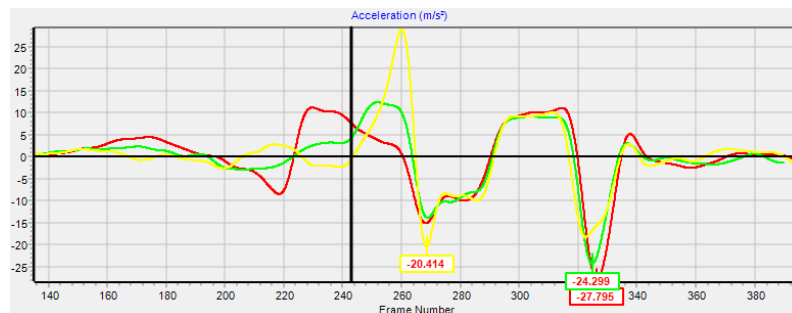
**Minimums** – The user is able to identify the minimum point on the Distance, Velocity and Acceleration graphs. Options are:

- Min
- Min and Value
- Min, X Pos and Value.

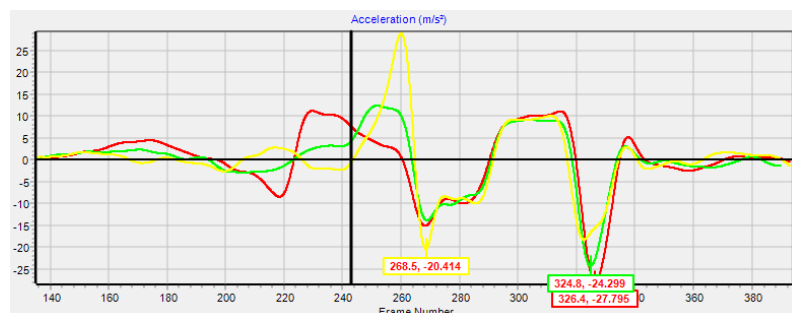
*Min* – This will draw a small notch for each individual trace at the minimum position of the graph for distance, velocity and acceleration.



*Min and Value* – This will draw a small notch and give the minimum value at the minimum position of the graph for distance, velocity and acceleration.



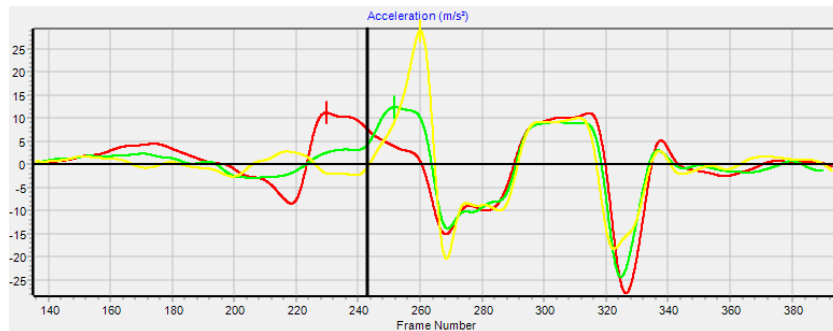
*Min, X Pos and Value* – This will draw a small notch, the X position (whether this be time or frame number) and the minimum value at the minimum position of the graph for distance, velocity and acceleration.



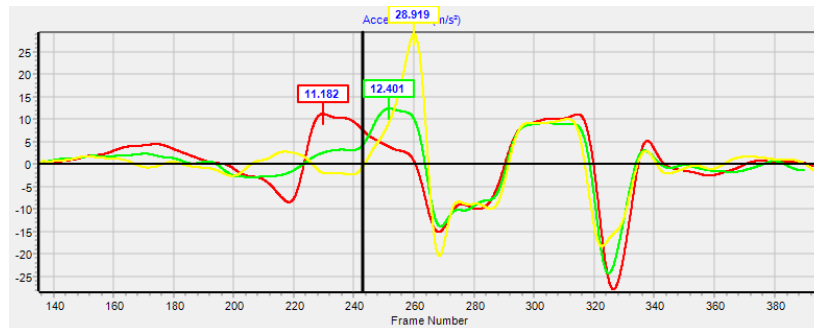
**Maximums** – The user is able to identify the maximum point on the Distance, Velocity and Acceleration graphs. Options are:

- Max
- Max and Value
- Max, X Pos and Value.

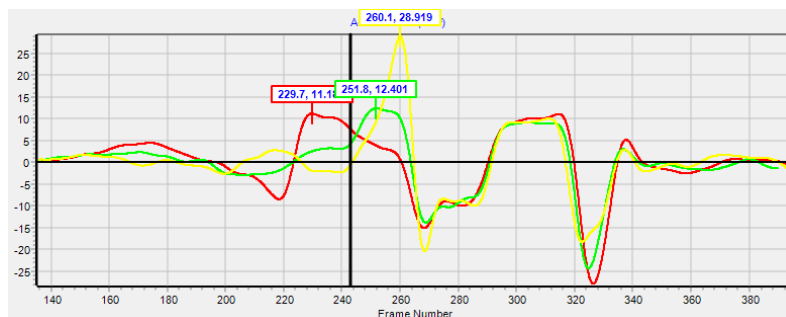
*Max* – This will draw a small notch for each individual trace at the maximum position of the graph for distance, velocity and acceleration.



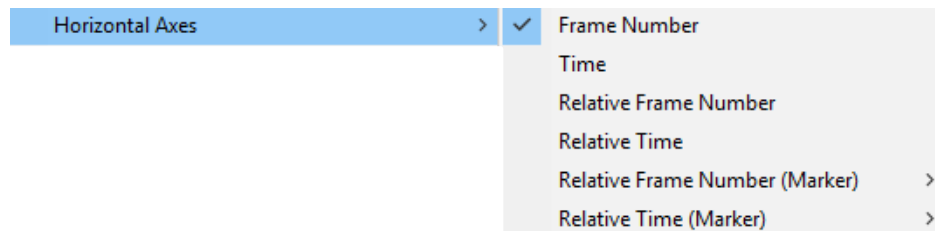
*Max and Value* – This will draw a small notch and give the maximum value at the maximum position of the graph for distance, velocity and acceleration.



*Max, X Pos and Value* – This will draw a small notch, the X position (whether this be time or frame number) and the maximum value at the maximum position of the graph for distance, velocity and acceleration.



**Horizontal Axes** – This allows the user to edit the horizontal axes on the Distance, Velocity and Acceleration graphs. The options available to the user are: Frame Number, Time, Relative Frame Number, Relative Time, Relative Frame Number (Marker) and Relative Time (Marker).



*Frame Number* – The horizontal axis will be the relevant frame numbers from the associated video. As both the associated video and the Single Linear Analysis Window are synchronised, the frame numbers of the video will match the frame numbers on the graphs e.g frame number 796 in the video will also be frame number 796 on the graphs.

*Time* – The horizontal axis will be the relevant time from the associated video. This is time from the start of the video, not the digitisation trace. For example, if your digitisation trace starts at 1.2 seconds into the video, 1.2 seconds will be where the horizontal axis will start from.

*Relative Frame Number* – The horizontal axis will start from 0, with 0 being the start of the digitisation trace as it is relative to the first digitised frame. For example, if your digitisation trace starts at frame number 614 on the video, this will appear as 0 on the graphs.

*Relative Time* – The horizontal axis will start from 0, with 0 being the start of the digitisation trace as it is relative to the first digitised frame. For example, if your digitisation trace starts at 0.8 seconds into the video, this will appear as 0 on the graphs.

*Relative Frame Number (Marker)* – This allows the user to change the 0 point of the x axis to a Marker (Key Event) of their choice, if there are any saved for the associated video and digitisation trace. The x axis will then be frame numbers relative to that frame.

*Relative Time (Marker)* - This allows the user to change the 0 point of the x axis to a Marker (Key Event) of their choice, if there are any saved for the associated video and digitisation trace. The x axis will then be time relative to that frame.

**Vertical Axes** – This will allow the user to adjust the Vertical Axes of the Displacement, Velocity and Acceleration graphs independently. As default, Quintic will automatically scale the Vertical Axes to the best possible fit, so that both the minimum and maximum values are displayed in each graph.

Graph Type	Automatically Scale Vertical Axis	Minimum	Maximum
Linear Displacement	<input checked="" type="checkbox"/>	0.08	2.78
Linear Velocity	<input checked="" type="checkbox"/>	0.02	3.09
Linear Acceleration	<input checked="" type="checkbox"/>	-27.80	28.92

Users are able to manually adjust the Vertical Axes, by unticking the 'Automatically Scale Vertical Axis' for the graph they would like to manually scale, whether this be Distance, Velocity or Acceleration. Then simply enter in the Minimum and Maximum values you would like the vertical axis to display. You should notice the graph being updated live. Once you have set the vertical axis, simply close the Vertical Axes Settings Window. These axes settings will be remembered when opening and closing the analysis window.

**Raw/Smoothed** – This allows the user to display either the Raw data for the distance, velocity and acceleration graphs or the Smoothed data with the parameters selected from within the smoothing window.

**Moving Average** – As default, a moving average is applied to the digitised data. This will be a moving average of 5 i.e the average of 2 frames previous to your current frame, your current frame and 2 frames after your current frame. This applies to all of the distance, velocity and acceleration graphs. The user is able to control how many frames should be taken into account for the moving average (3, 5, 7, 9, 11) or turn the moving average off completely (1).

**Linear Spline** – As default, a Linear spline is applied to the digitised data, in order for it to appear smoother. The user has the ability to turn this linear spline on or off by either selecting or deselecting this option within the analysis window.



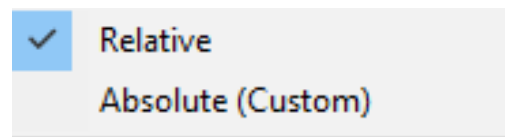
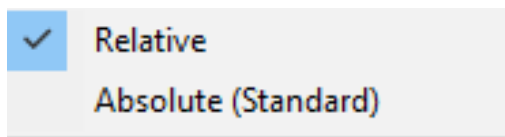
**Velocity and Acceleration** – This allows the user to edit the way velocity and acceleration is calculated and displayed. This can either be:

- one frame before
- one frame before and one after

**Show First/Last 6 Frames** – This controls whether the first 6 and last 6 digitised frames are displayed within the analysis windows. As default, Quintic will not display these frames due to any potential smoothing filters applied to the data. The user is able to control whether this should be on or off.

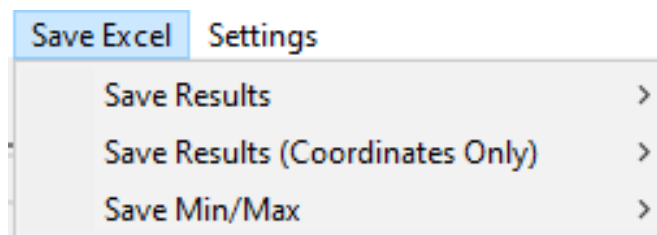
#### f. Origin

Within the Origin Menu, the user is able to change the origin of the data. The origin options are either: Relative (from the start point of the marker) or Absolute (the 0,0 coordinate). If a user has a Custom Origin, the Absolute option will be 'Absolute (Custom)', if there is no Custom Origin, the Absolute option will be 'Absolute (Standard)'. As default the Quintic analysis windows will be set to relative.



#### g. Save Excel

Within the Save Excel menu, the user is able to save the results which are displayed on the Distance, Velocity and Acceleration graphs into an Excel spreadsheet for further analysis.



Users have the option to:

*Save Results* – Saves whatever points are displayed on the distance, velocity and acceleration graphs.

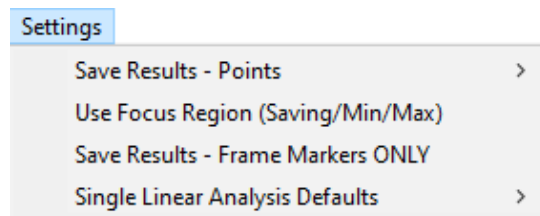
*Save Results (Co-Ordinates Only)* – Saves the co-ordinates of each point only. The user is then able to calculate the distance, velocity and acceleration manually.

*Save Min/Max* – Saves the Min/Max of the points displayed on the graphs. X position is also given (whether this be frame number or time).

With any option, users can either save the excel as an .xls (97-2003) or an .xlsx (2007 +). It is recommended that .xls is used for clients who are using the excels for our Quintic Automatic Reporting Software. Once you have chosen your preferred file type, simply choose where you would like the file to be saved and name it appropriately.

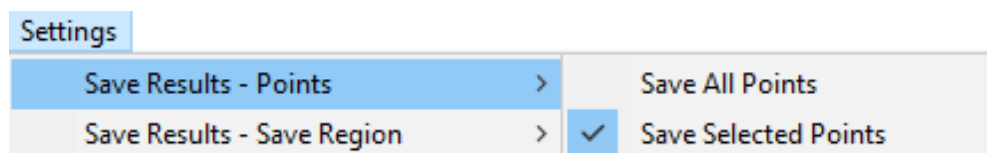
## h. Settings

Within the Settings menu, the user is able to choose their preferred settings for 'Save Results – Points', 'Use Focus Region (Saving/Min/Max)', 'Save Results – Frame Markers ONLY' or 'Single Linear Analysis Defaults'.

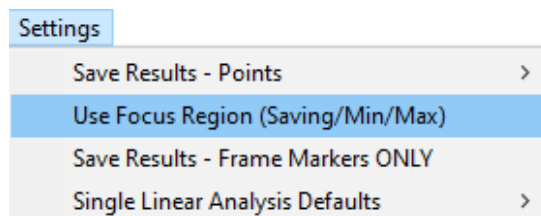


*Save Results – Points* - When exporting the data from the Single Linear Analysis Window, users are able to choose which data is exported to the Excel.

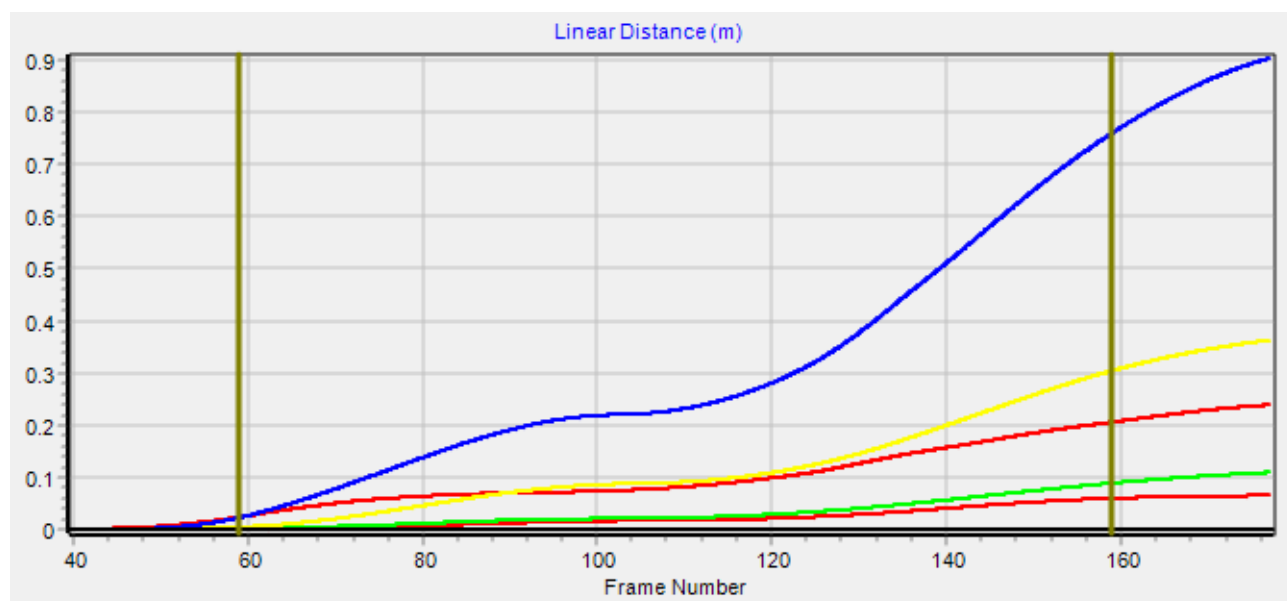
Users can 'Save All Points' or 'Save Selected Points' within the 'Save Results – Points' setting in the Single Linear Analysis Window. For example, if you have only selected the Knee point and chosen the 'Save Selected Points' option, only the knee data will be exported to the Excel.



*Use Focus Region (Saving/Min/Max)* - Users can also choose to save all the data on the graph or a particular region of the graph. They are able to do this by going to Settings, then 'Use Focus Region (Saving/Min/Max)'.



When the 'Use Focus Region (Saving/Min/Max)' is activated, the focus region will show on the graphs in Gold vertical lines.



Users can control the save region by using the 'Focus Region' sliders on the right-hand side of the Single Linear Analysis Window.

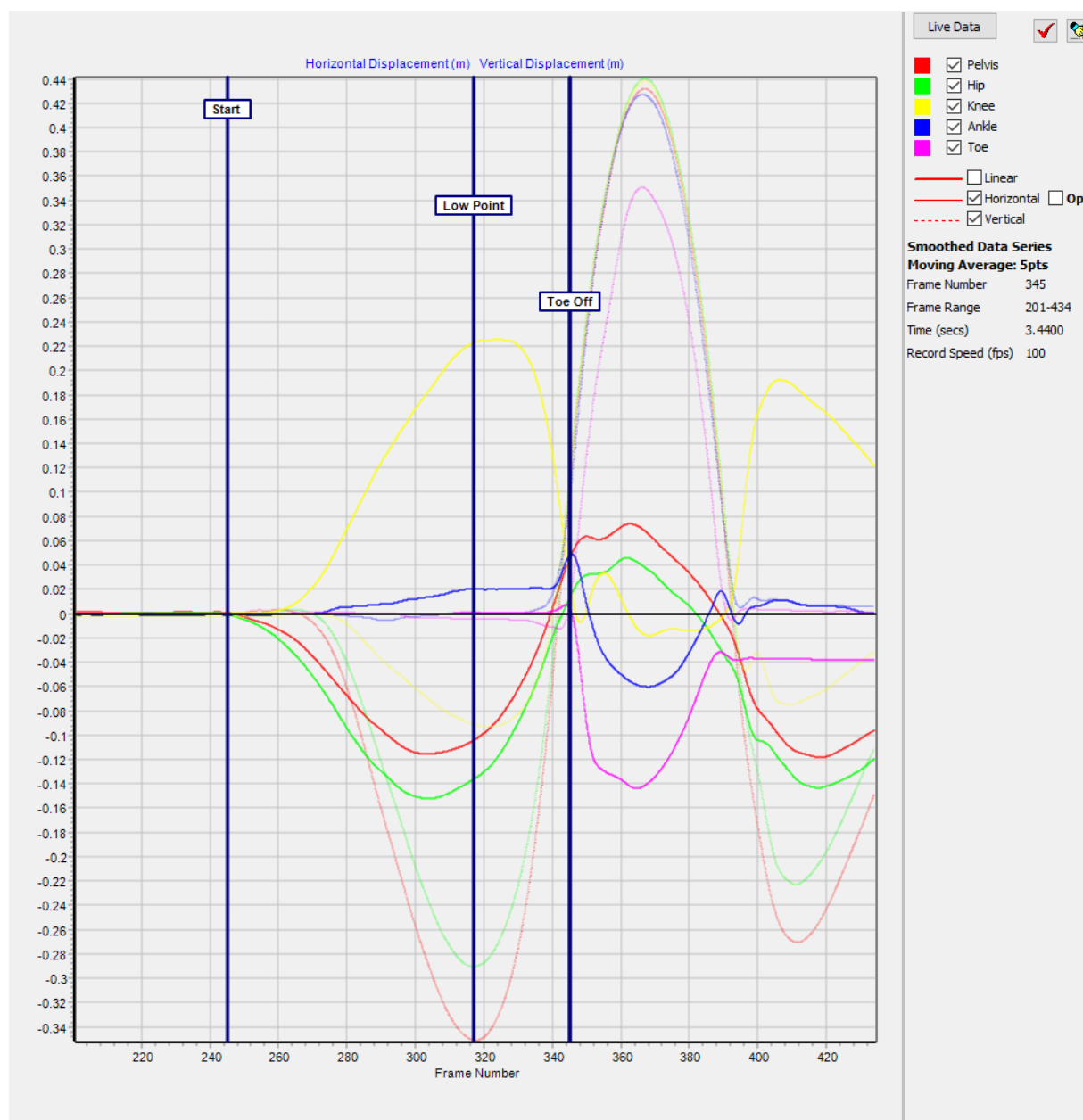
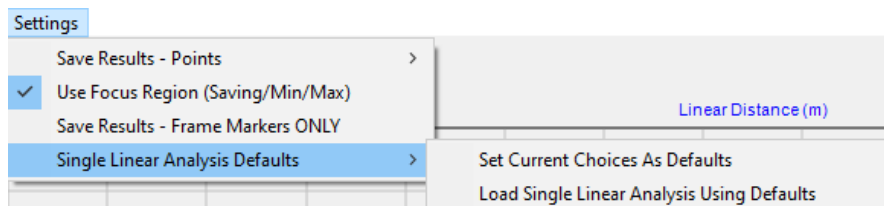


To use the particular region you have selected, click 'Use Focus Region' and when you save results as an Excel (by going to the Save Results tab), only the points within the saved region will be saved to the Excel. This is ideal for clients who own and use any of the Quintic Automatic Reports.

The Focus Region also effects the Min and Maxs. If the focus region is in use, and Min/Max are also in use, only the Min/Max within the Focus Region will be displayed on the graphs.

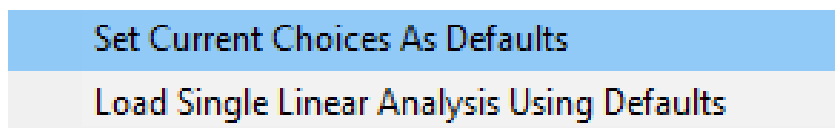
*Save Results – Frame Markers ONLY* – This allows the user to export the data from the Frame Event Markers to Excel. Please note that the video must have Frame Markers set.

*Single Linear Analysis Defaults* – This gives the user the option to set their default analysis window settings (Single Linear only for Sports v35). Every time you open the Single Linear Analysis window, your preferred analysis settings will be remembered and used.

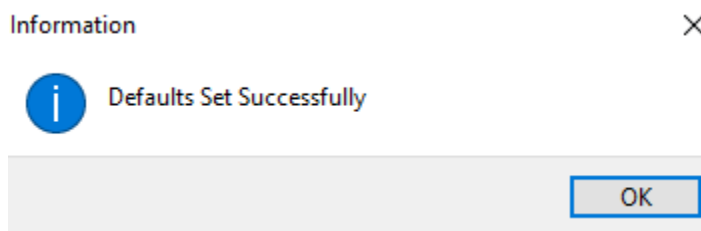


Once you are happy with the settings that you have chosen, go to the settings option within the analysis window.

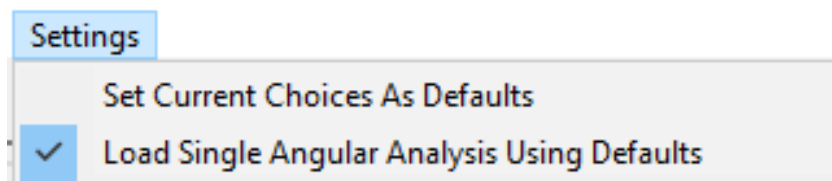
Then select 'Set Current Choices As Defaults' and this will remember your preferred settings.



An information window will pop up to confirm that the defaults have been set.



In order for the software to load your default analysis settings, please select 'Load Analysis Using Defaults' for the Single Linear Analysis window. You would have to do this for each of the analysis windows (Single Linear, Single Angular, Multi Linear and Multi Angular).



Please see below for more information on what will be remembered in the Single Linear Analysis Window:

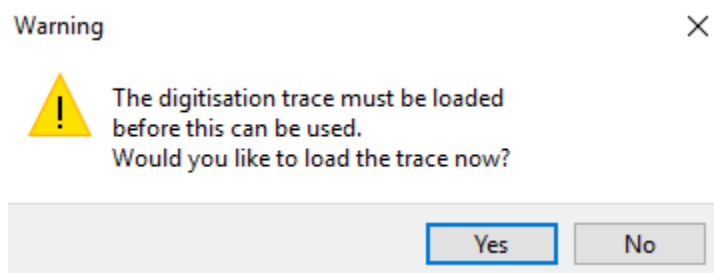
#### Single Linear

- Template Point Names (to check that when Single Linear is next loaded, it is the correct template)
- Which points within the template are selected (so if it's a side view gait you might have hip and knee ticked and all the others unticked – this will mean it is just hip and knee are displayed when you next open a side view gait)
- Linear/Horizontal/Vertical choice (inc. Horizontal Opp.)
- Whether you have expanded a graph
- Which your preferred Unit is in the Units drop-down
- Your display preferences (specifically: Show Interpolation Markers, Show Frame Position, Show Frame Markers, Show Interpolated Regions)
- Min/Max display choices
- Origin drop-down choice

### 3. Single Video Angular Analysis

Once the video has been digitised and the trace has been loaded, simply click on the **'Single Video Angular Analysis'** option after the Angular Analysis button has been pressed.

If the digitisation trace has not been loaded on the video, the following pop up will appear, asking you to load the digitisation trace. Please click **'Yes'**.



Once the digitisation trace is loaded and the **'Single Video Angular Analysis'** button has been pressed, the Single Video Angular analysis window will load.

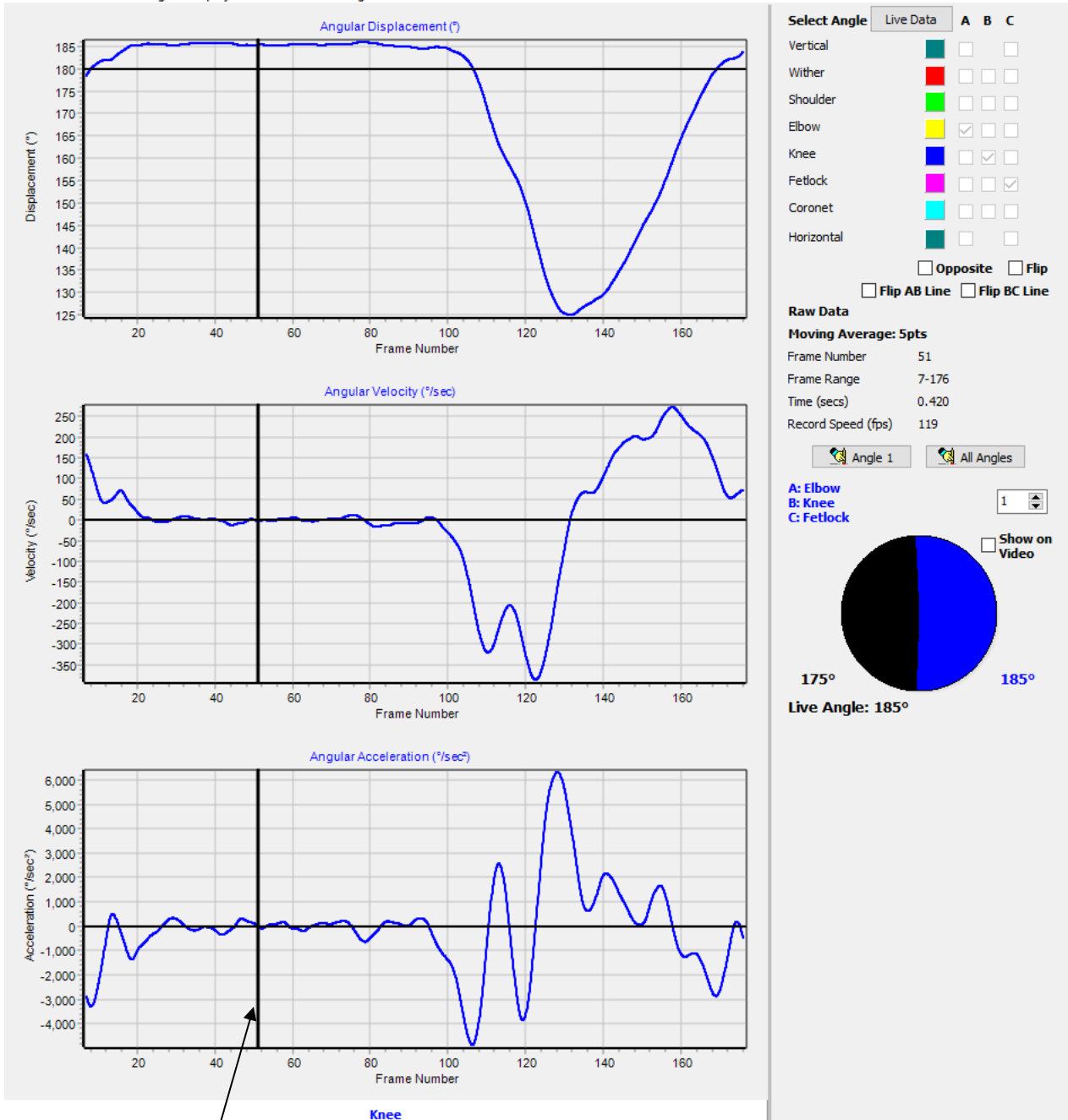
This will display the Angular Displacement, Angular Velocity and Angular Acceleration in 3 different graphs, for the selected angle throughout the digitisation trace. As default, the angle that is calculated is the first three points, e.g Vertical, Point 1 and Point 2.

If there are any Time Event Markers (please see Tutorial 2 for further information) that have been saved with the current video, they will also be displayed onto all 3 graphs. This will allow the user to quickly identify on the graph the key events of interest to them (e.g. Impact, Low Point, Toe Off etc). The Time Event Markers will be displayed on the graphs by a blue line, with the default name of Marker 1, Marker 2, if the Time Event Markers have not been named, or the relevant name of that marker if they have been named.

Any Interpolation Markers that have been added to the digitisation trace and saved, will also be shown on the graphs. These are shown with a burgundy line on the graphs.

Please see below an example of the Single Video Angular Analysis Window within Quintic Biomechanics v35 software.

File Units Frames/Page Display Save Excel Settings










Both the video and analysis windows are synchronised, therefore if the video is played while the separate analysis window is open, a black line indicates the current video frame.

Live Data Table – This button will open the Live Data table, which allows the user to easily identify data values at specific points of interest, throughout the video. Please see the heading Live Data Table below for more information.

Select Angle



Live Data

A B C

Vertical		<input type="checkbox"/>	<input type="checkbox"/>
Pelvis		<input type="checkbox"/>	<input type="checkbox"/>
Hip		<input type="checkbox"/>	<input type="checkbox"/>
Knee		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ankle		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Toe		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Horizontal		<input type="checkbox"/>	<input type="checkbox"/>

☐ Opposite
 ☐ Flip
 ☐ Flip AB Line
 ☐ Flip BC Line

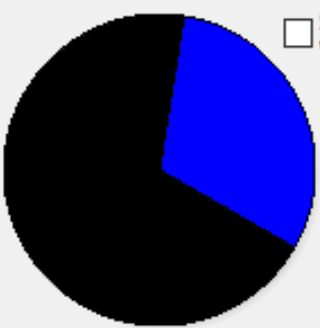
**Smoothed Data**  
**Moving Average: 5pts**  
 Frame Number 269  
 Frame Range 201-434  
 Time (secs) 2.680  
 Record Speed (fps) 100

 Angle 1
  All Angles

A: Knee  
 B: Ankle  
 C: Toe

1

☐ Show on Video



**Live Angle: 111°**

This is where the user is able to create the angle they wish to analyse. The digitisation template will be displayed along with the vertical and horizontal. To create an angle, the user simply chooses the three points in which the angle is created, with Point B being the centre of the angle you are interested in and Point A and C the points from which the angle is created. For example, to create the ankle angle, Knee would be point A, Ankle point B and Toe point C.

This allows the user to 'Opposite', 'Flip', 'Flip AB Line' or 'Flip BC Line' for the angle being displayed. Opposite will display the opposite angle from the one currently being displayed (i.e 360 minus). Flip will change the angle from positive to negative or vice versa. Flip AB Line will flip the AB Line of the created angle. Flip BC Line will flip the BC Line of the created angle.

This displays information on the data series. Please see above under Single Linear Analysis for further information on each heading.

These buttons will either reset the current angle you are displaying or all of the angles you have created on the graphs.

This counter allows the user to display more than one angle on the graph. When increased the user then is able to create another angle to display. The user is able to display up to 10 angles on the same graph. The counter can also be used to toggle between which angles are displayed on the relevant pie charts.

This provides an overview of the current angle being displayed on the graph. It informs the user on the points from which the angle is created. As well as this, the live angle is shown in a text and pie chart format, which gets updated frame by frame as the video is scrolled/played. The opposite is also displayed in black with the live angle being displayed in blue. The user also has the option to display the live angle from pie chart 1 (only the angle relating to Pie Chart 1 can be used) on the video footage. Once you have selected your angle, simply tick the 'Show on Video' box next to Pie Chart 1. This will then show the angle in question on the video.



### a. Functions

Within the Single Video Angular Analysis window there are a range of functions which the user is able to change, which directly affects the Angular displacement, velocity and acceleration graphs.

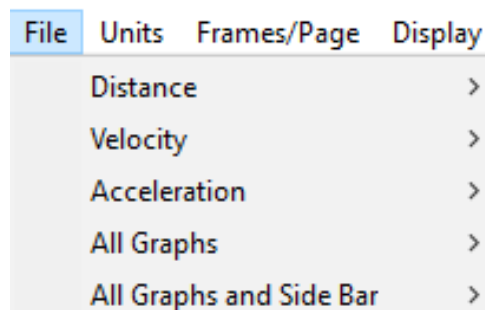
The functions are available at the top of the Single Video Angular Analysis Window and are as follows:

**File   Units   Frames/Page   Display   Save Excel   Settings**

---

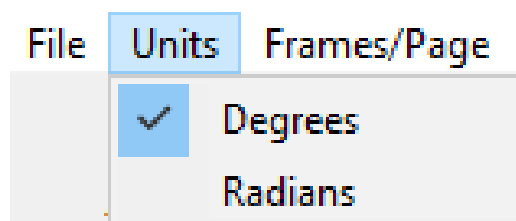
### b. File

Within the File menu, the user is able to Print, Print Preview, Save as JPEG or Copy to Clipboard the individual Angular Displacement, Velocity and Acceleration graphs. The user is also able to Print, Save as JPEG or Copy to Clipboard the Angular Displacement, Velocity and Acceleration Graphs with or without the side bar as one image.



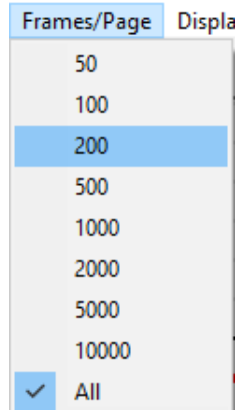
### c. Units

Within the Units menu, the user is able to change the units for the data within the Angular Displacement, Velocity and Acceleration Graphs. The options are as follows: Degrees, Radians.

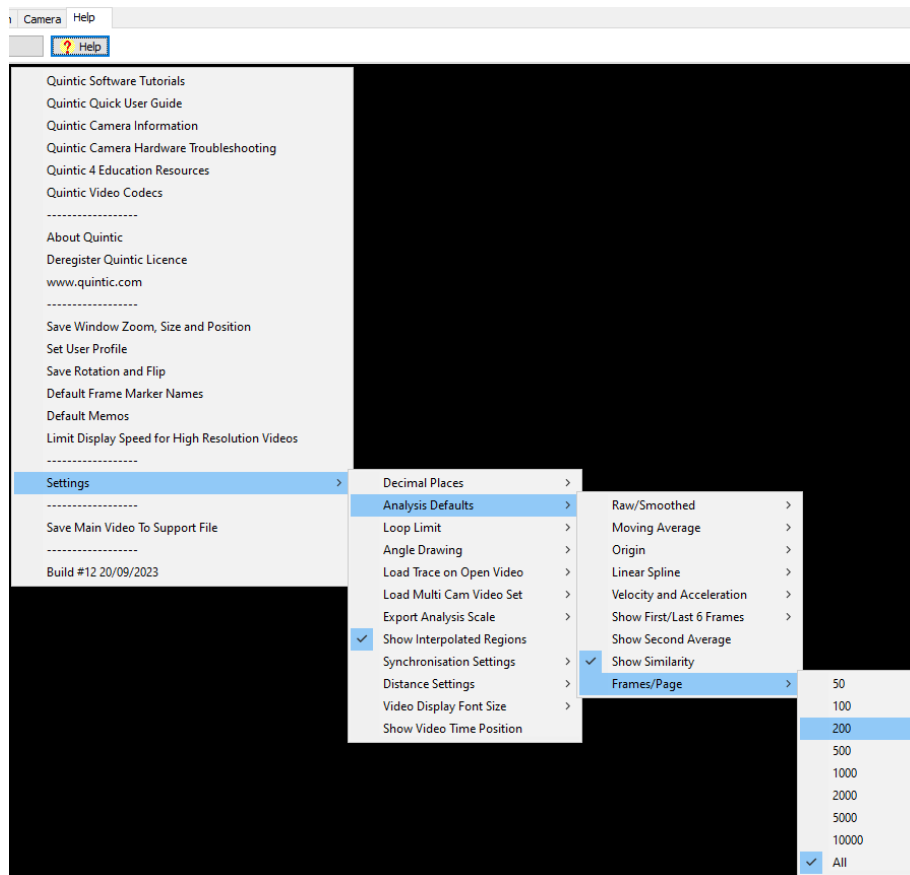


#### d. Frames/Page

Within the Frames/Page menu, the user is able to select how many frames are displayed on the graphs within the analysis window. This is ideal for users who have long digitisation traces.

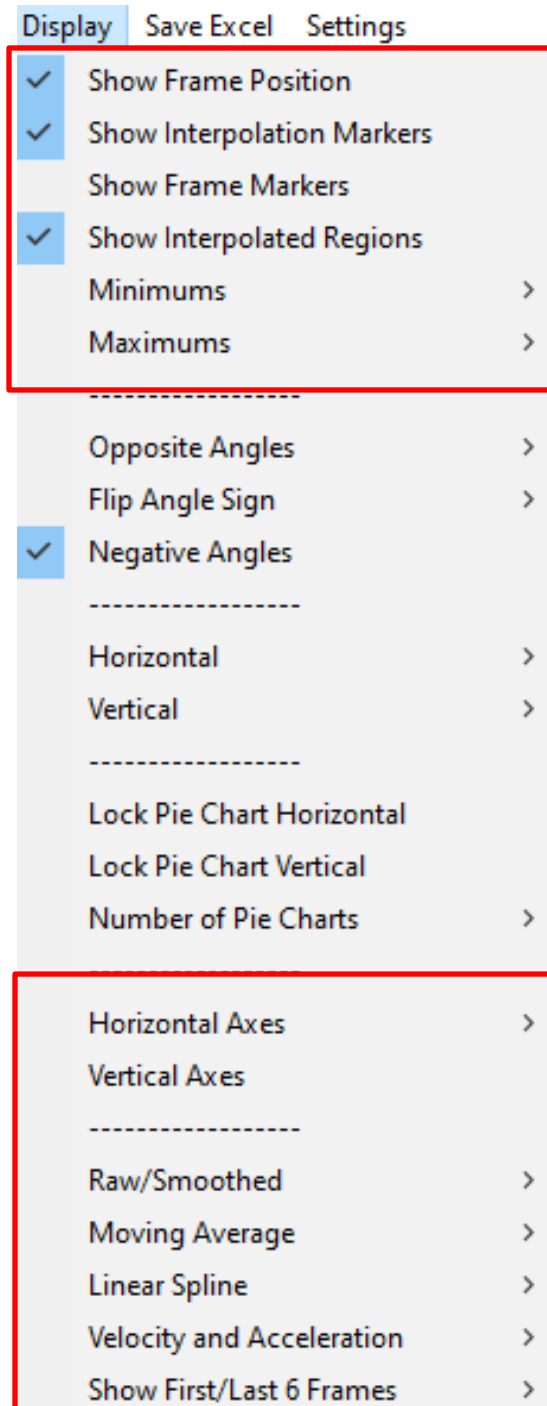


As default, the analysis windows will display all of the points on the graphs. Should users want to change this, they are able to do this by going to the Help tab within the main Quintic software. To do this, click the 'Help' button, then Settings, Analysis Defaults, Frames/Page and then select your preferred option. This will apply to all analysis windows.



## e. Display

Within the Display menu, the user is able to adjust certain display settings which affect the Angular Displacement, Velocity and Acceleration graphs.



These have already been covered. Please see above under 'Single Linear Analysis' for more information on these features.

**Opposite Angles** – Opposite will display the opposite angle from the one currently being displayed.

**Flip Angle Sign** – This will change the angle from positive to negative or vice versa.

**Negative Angles** – This allows negative angles to be displayed. As default, this setting is switched on. This is particularly useful when looking at an angle which fluctuates around 0.

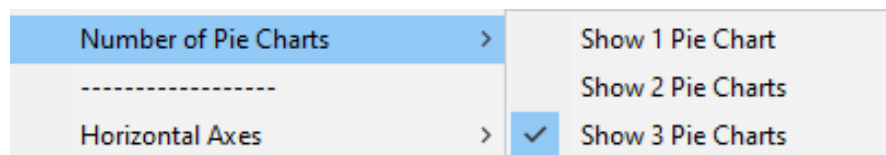
**Horizontal** – If an angle has been created using the horizontal, the user is able to choose whether the horizontal will be to the left or to the right. As Default this is set to the right.

**Vertical** – If an angle has been created using the vertical, the user is able to choose whether the vertical will be to the top or bottom. As default this is set to the top.

**Lock Pie Chart Horizontal** – This will allow the user to lock the pie chart to the horizontal.

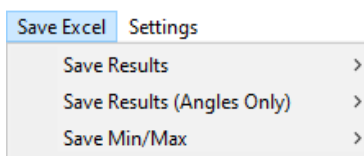
**Lock Pie Chart Vertical** – This will allow the user to lock the pie chart to the vertical.

**Number of Pie Charts** – The user is able to control how many pie charts are displayed next to the graphs within Single Angular Analysis (maximum of 3). Users are able to use the top counter within the Single Angular Analysis to create more than one angle on the graph. You can then use the other counters to show the angles of interest on the 3 Pie Charts.



## f. Save Excel

Within the Save Excel menu, the user is able to save the results which are displayed on the Angular Displacement, Velocity and Acceleration graphs into an Excel spreadsheet for further analysis.



Users have the option to:

**Save Results** – Saves whatever angles (up to 10) are displayed on the angular displacement, velocity and acceleration graphs.

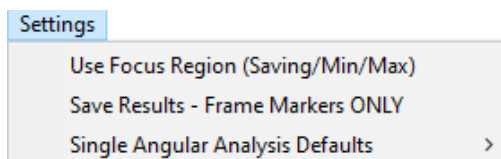
**Save Results (Angles Only)** – Saves the angles only. The user is then able to calculate the angular velocity and acceleration manually.

**Save Min/Max** - Saves the Min/Max of the angles displayed on the graphs. X position is also given (whether this be frame number or time).

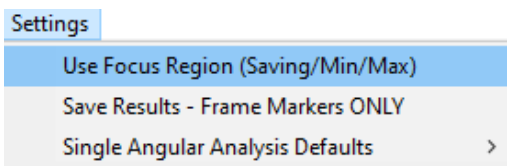
With any option, users can either save the excel as an .xls (97-2003) or an .xlsx (2007 +). Once you have chosen your preferred file type, simply choose where you would like the file to be saved and name it appropriately.

## g. Settings

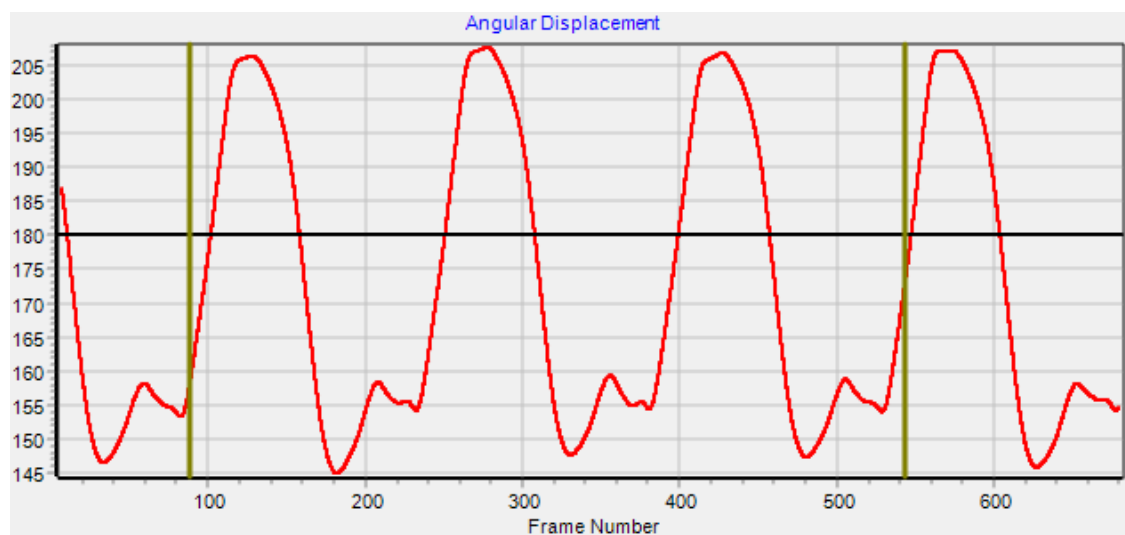
Within the Settings menu, the user is able to choose their preferred settings for 'Use Focus Region (Saving/Min/Max)', 'Save Result – Frame Markers ONLY' or 'Single Angular Analysis Defaults'.



*Use Focus Region (Saving/Min/Max)* – Users can choose to save all the data on the graph or a particular region of the graph. They are able to do this by going to Settings, then 'Use Focus Region (Saving/Min/Max)'.



When the 'Use Focus Region (Saving/Min/Max)' is activated, the save region will show on the graphs in Gold vertical lines.



Users can control the save region by using the 'Focus Region' sliders on the right-hand side of the Single Angular Analysis Window.

**Focus Region** ☐ Lock

Left <  7

Right <  121

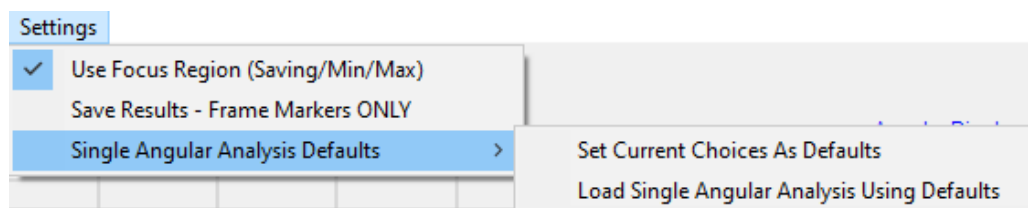
To use the particular region you have selected, click 'Use Focus Region' and when you save results as an Excel (by going to the Save Results tab), only the points within the saved region will be saved to the Excel.

The Focus Region also effects the Min and Maxs. If the focus region is in use, and Min/Max are also in use, only the Min/Max within the Focus Region will be displayed on the graphs.

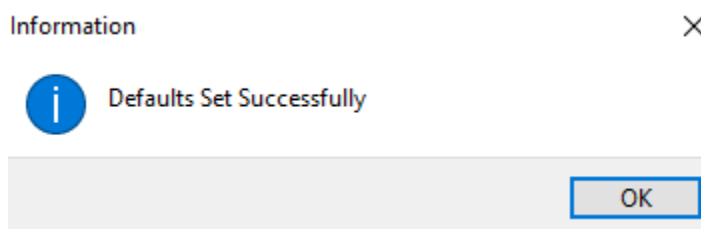
*Save Results – Frame Markers ONLY* – This allows the user to export the data from the Frame Event Markers to Excel. Please note that the video must have Frame Markers set.

*Single Angular Analysis Defaults* – This gives the user the option to set their default analysis window settings. Every time you open the Single Angular Analysis window, your preferred analysis settings will be remembered and used.

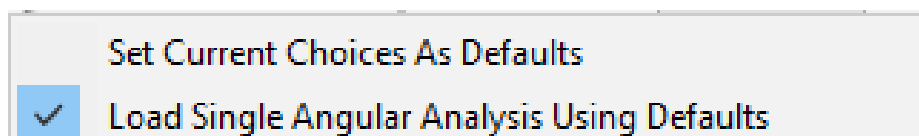
Once you are happy with the settings that you have chosen, go to the settings option within the analysis window. Then select 'Single Angular Analysis Defaults' then 'Set Current Choices As Defaults' and this will remember your preferred settings.



An information window will pop up to confirm that the defaults have been set.



In order for the software to load your default analysis settings, please select 'Load Analysis Using Defaults' for the Single Angular Analysis Window. You would have to do this for each of the analysis windows (Single Linear, Single Angular, Multi Linear and Multi Angular).



Please see below for more information on what will be remembered in the Single Angular Analysis window:

### Single Angular

- Template Point Names (to check that when Single Angular is next loaded, it is the correct template)
- Selection of up to 10 angles and whether they were “opposited,” “flipped,” or had “lines flipped”
- Chosen angle to be displayed across all 3 pie charts
- Whether you have expanded a graph
- Which your preferred Unit is in the Units drop-down
- Your display preferences (specifically: Show Series Values, Show Interpolation Markers, Show Frame Position, Show Frame Markers, Show Interpolated Regions)
- Min/Max display choices
- Allow Negative Angles choice
- Horizontal – Left/Right choice
- Vertical – Up/Down choice
- Pie Chart – Lock Horizontal/Vertical choice
- Number of pie charts displayed

## 4) Live Data Table

Within the Linear and Angular analysis windows, there is an option to display the live data table.

Live Data

To display the Live Data Table, simply click the Live Data button within the Linear or Angular analysis window.

Q Live Data Table ✕

Frame 309		Distance		Velocity			Acceleration			
		Linear	Horizontal	Vertical	Linear	Horizontal	Vertical	Linear	Horizontal	Vertical
Head		0.045			0.063			0.056		
Shoulder		0.064			0.044			-0.035		
Hip		0.240			0.206			0.797		
Knee		2.093			1.372			-3.443		
Ankle		2.767			1.293			-4.675		
Pedal		2.924			1.475			-1.178		

This will then display the data which is displayed on the Distance, Velocity and Acceleration graphs.

As the video plays through, the Live Data table will be updated with the current frame data.

Within the Analysis windows, if any points of the digitisation trace are unticked, this data will not be displayed within the Live Data table. If the Horizontal and Vertical (Linear Analysis only) options are ticked on the graph, this will also be displayed on the Live Data Table.

Q Live Data Table ×

Frame 309		Distance			Velocity			Acceleration		
		Linear	Horizontal	Vertical	Linear	Horizontal	Vertical	Linear	Horizontal	Vertical
Shoulder		0.064	0.000	-0.002	0.044	0.002	0.044	-0.035	-0.036	0.057
Hip		0.240	-0.001	-0.015	0.206	-0.017	0.207	0.797	1.120	1.095
Knee		2.093	0.032	-0.088	1.372	-0.609	1.240	-3.443	5.340	-1.121
Ankle		2.767	0.080	-0.044	1.293	-0.792	1.015	-4.675	-4.881	-10.059
Pedal		2.924	0.104	-0.059	1.475	-0.938	1.127	-1.178	-8.359	-8.381