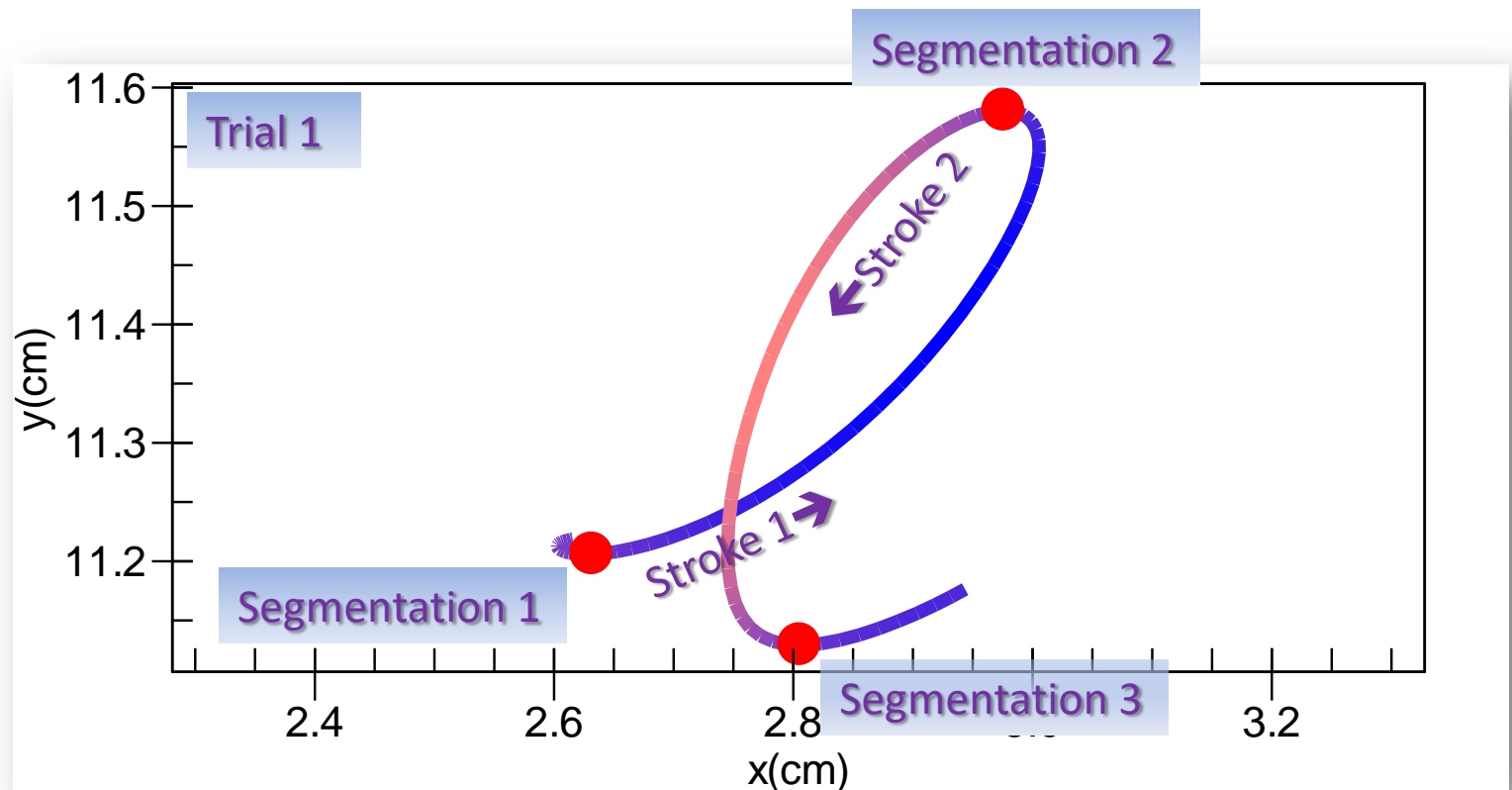


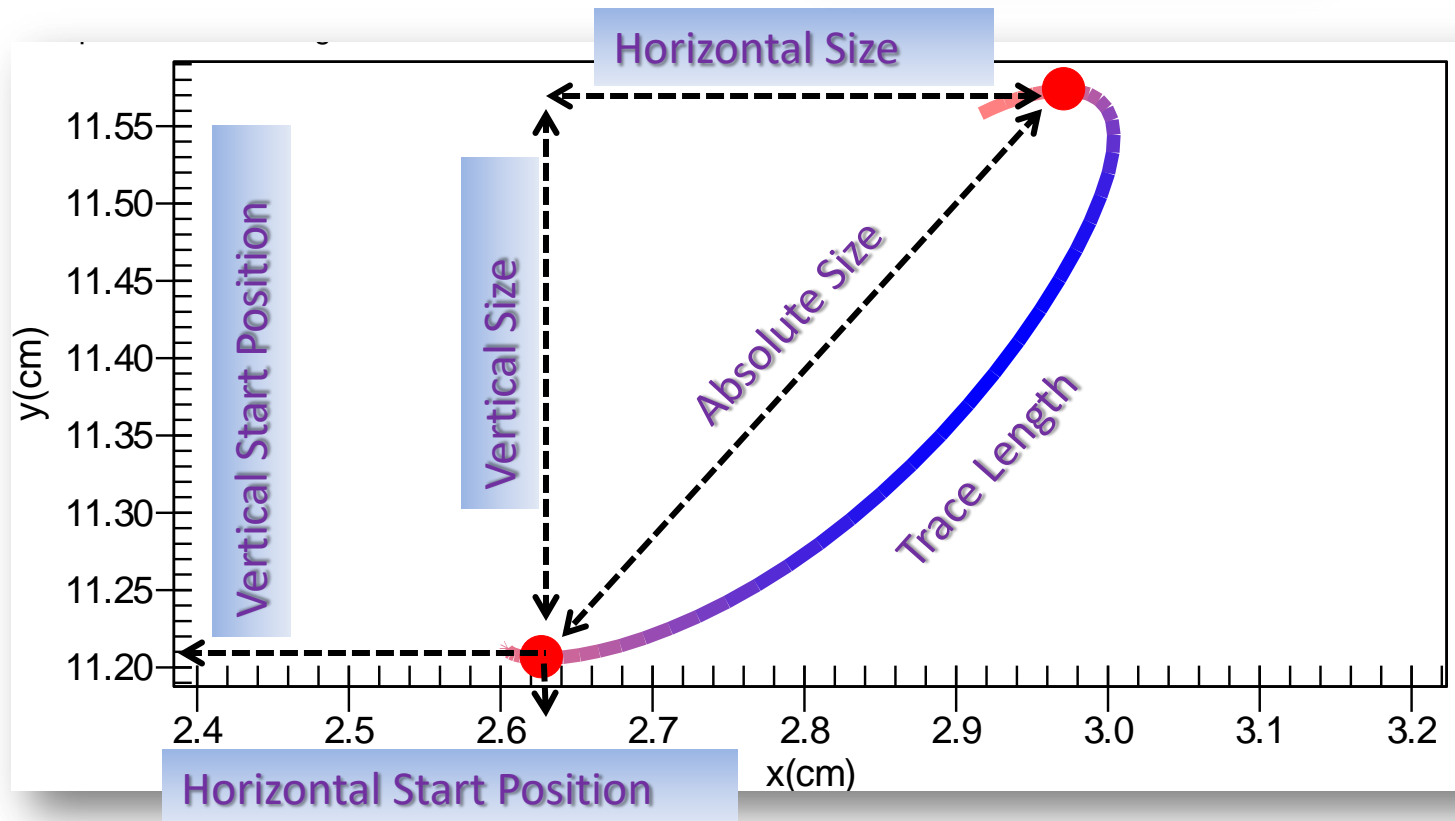
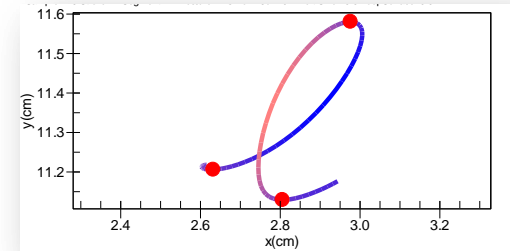
MovAlyzeR Features (Extracted features)

- Trial, Segmentations, Strokes



1a. Static (Shape) Features

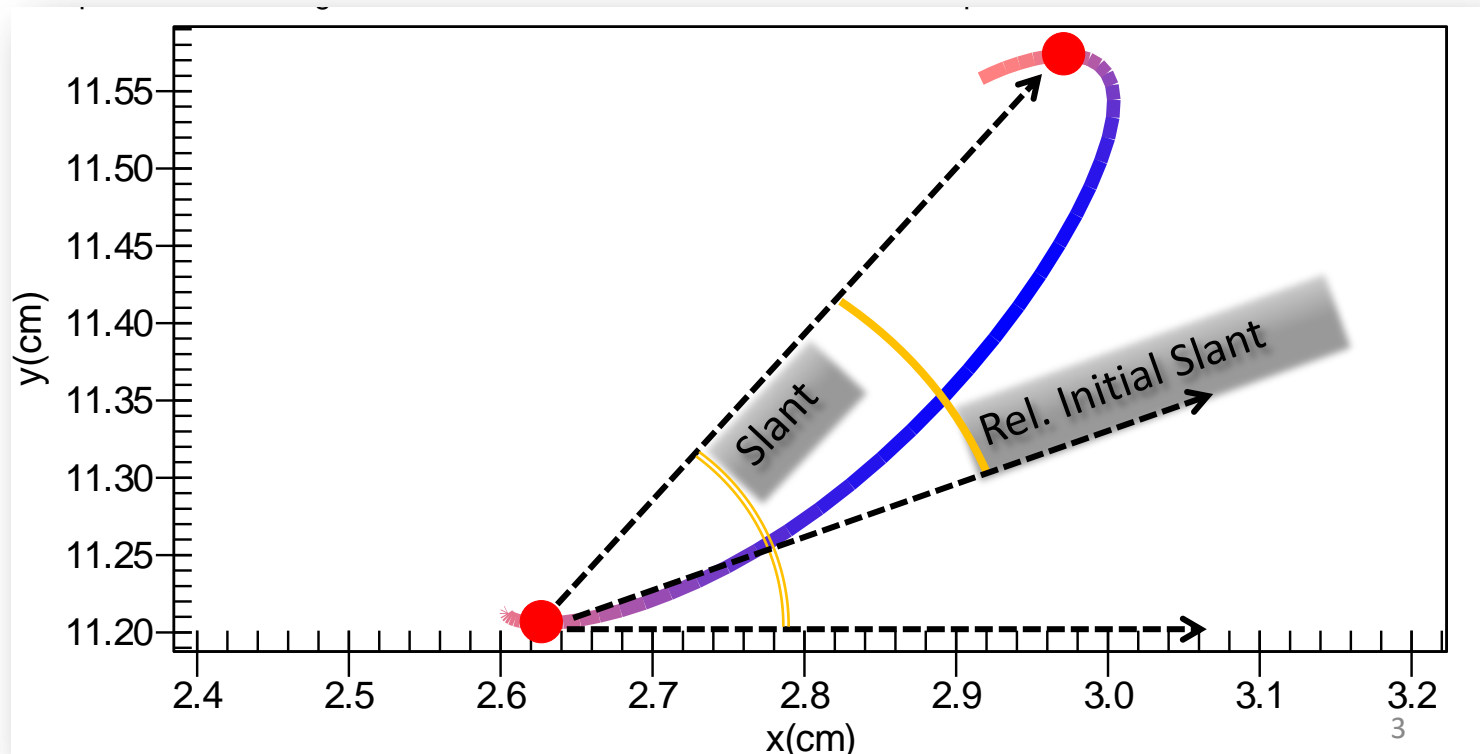
- **Positions and sizes (cm)**



1b. Static (Shape) Features

- Slant (radians)*
- Relative Initial Slant (radians) during first 80 ms*

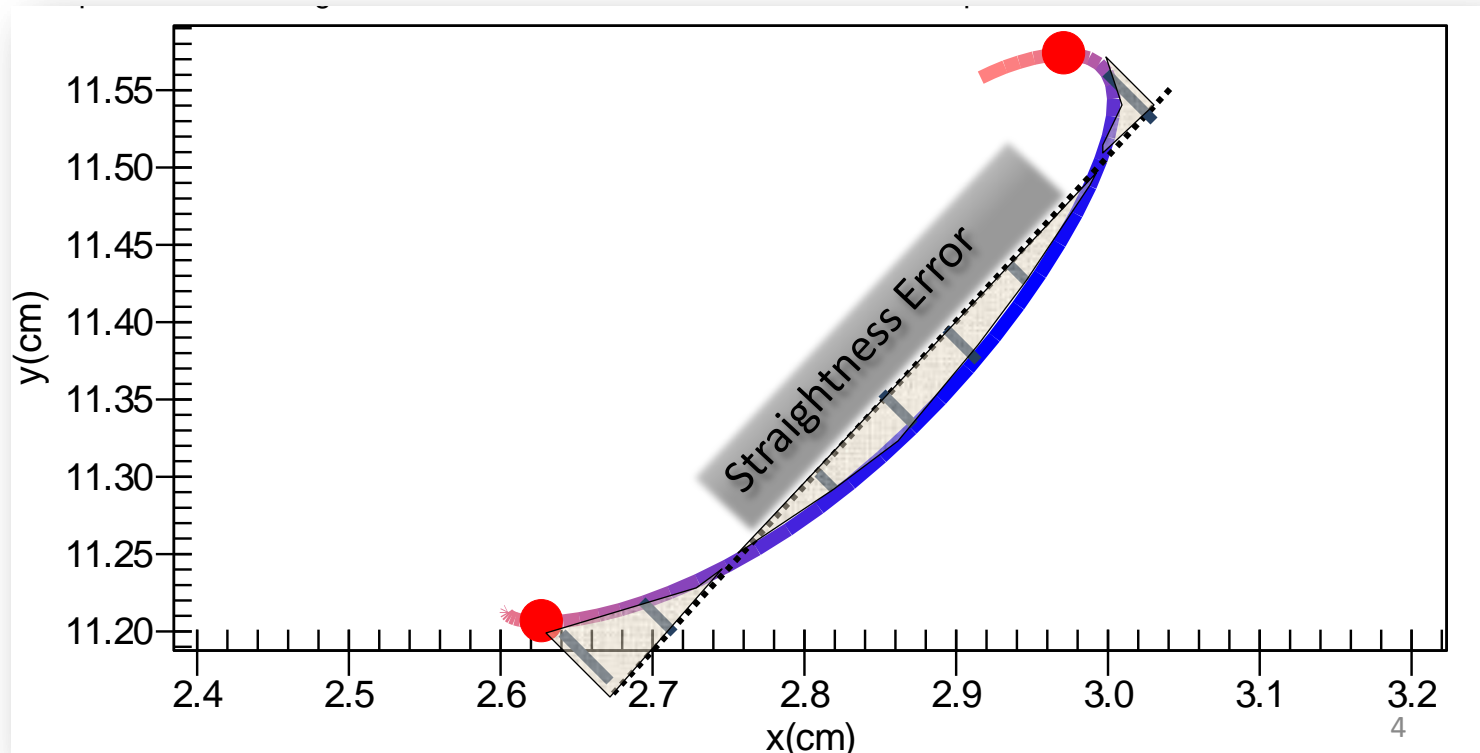
* Radian = Arc length / Radius
1 radian = 57 degrees



1c. Static (Shape) Features

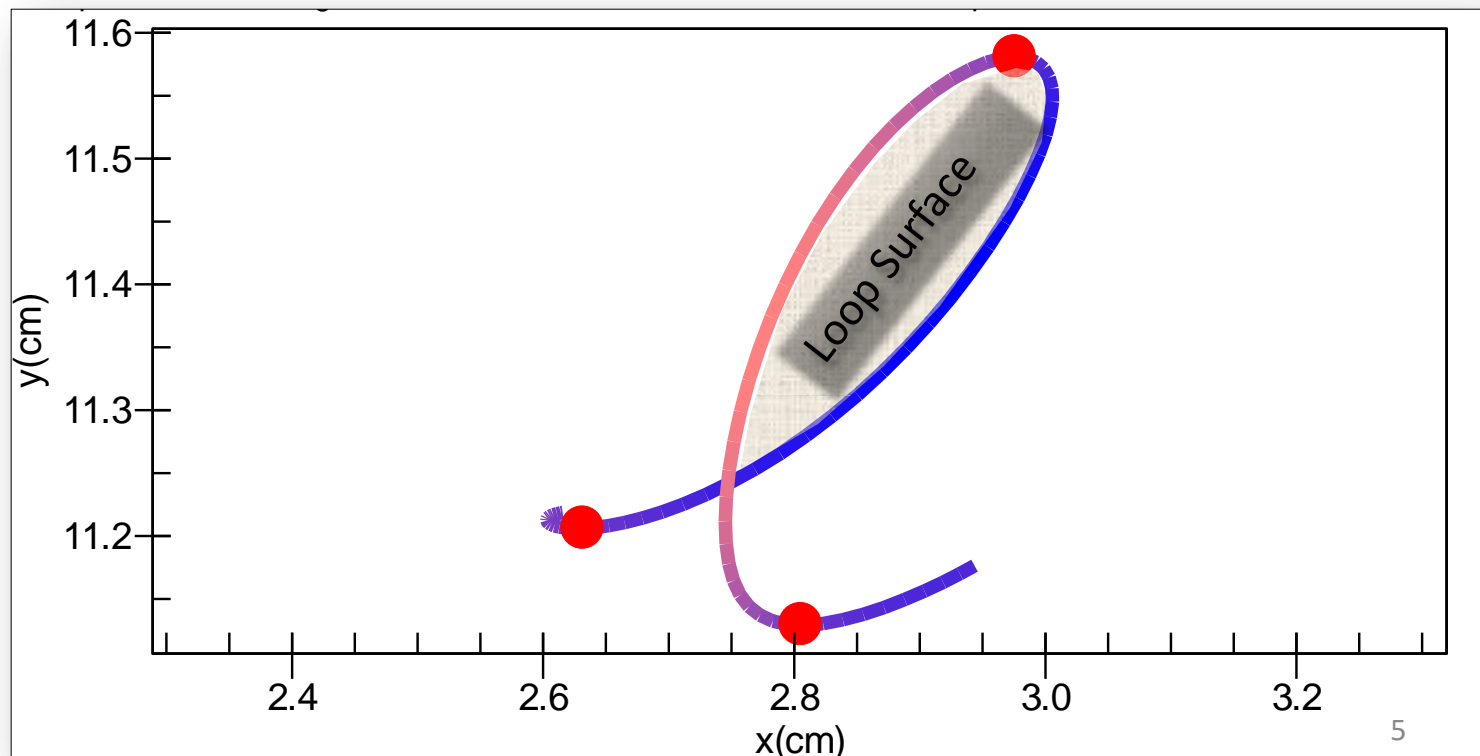
- Straightness Error (cm)

= Average distance to minimum RMS distance line

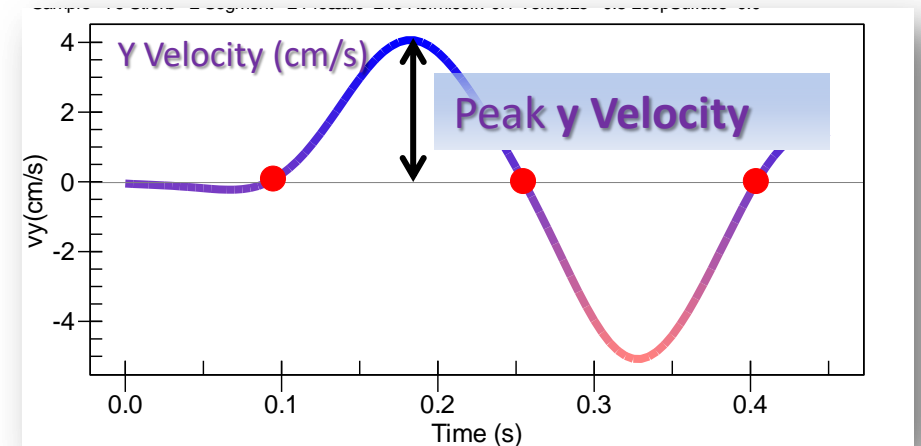
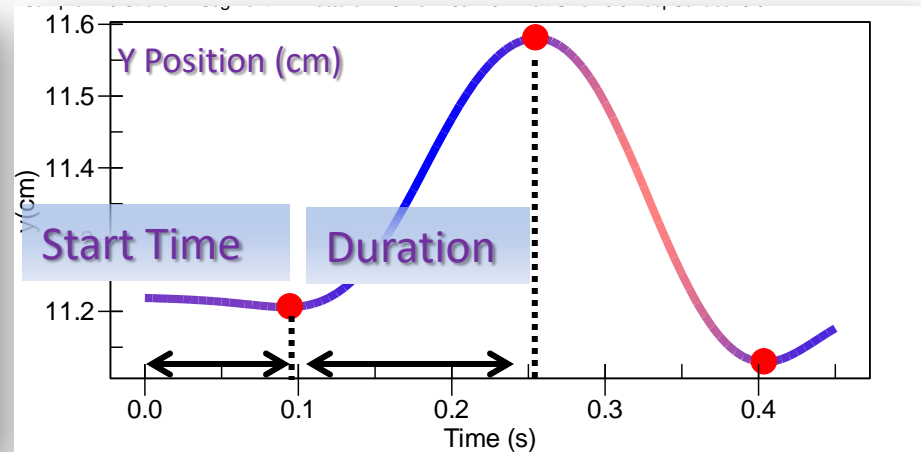
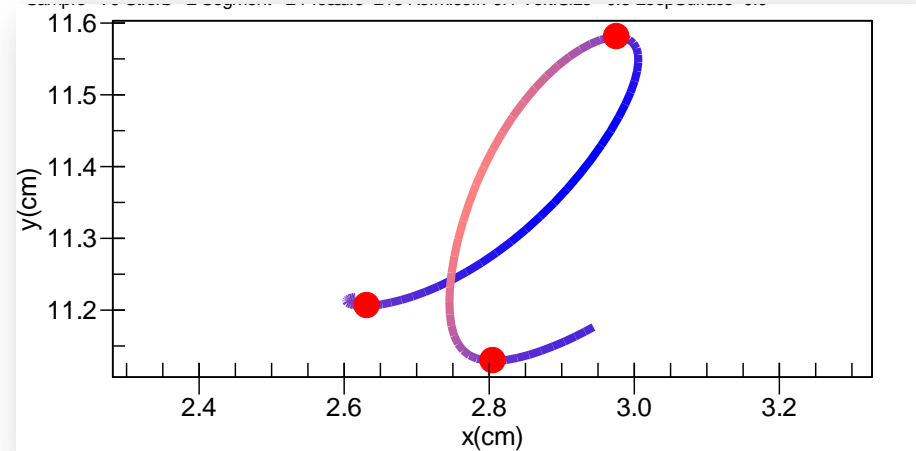


1d. Static (Shape) Features

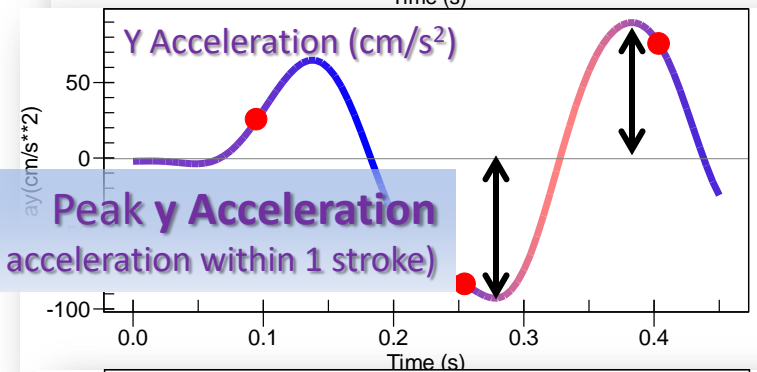
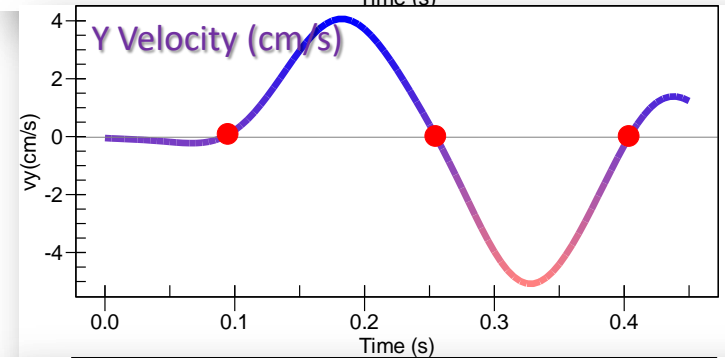
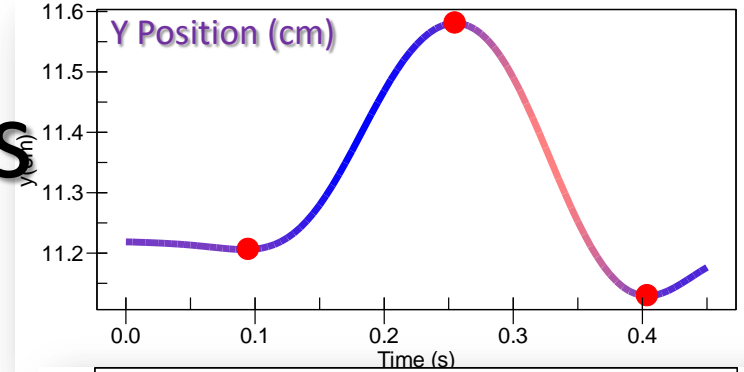
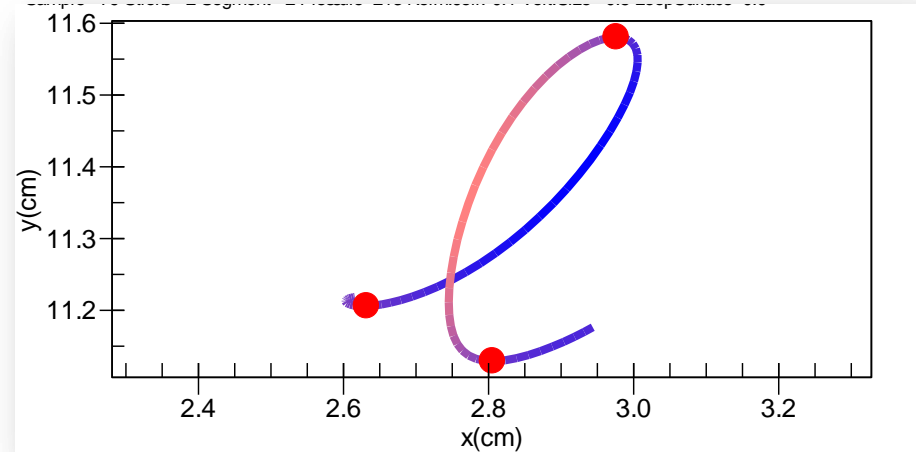
- Loop surface between successive strokes (cm^2)



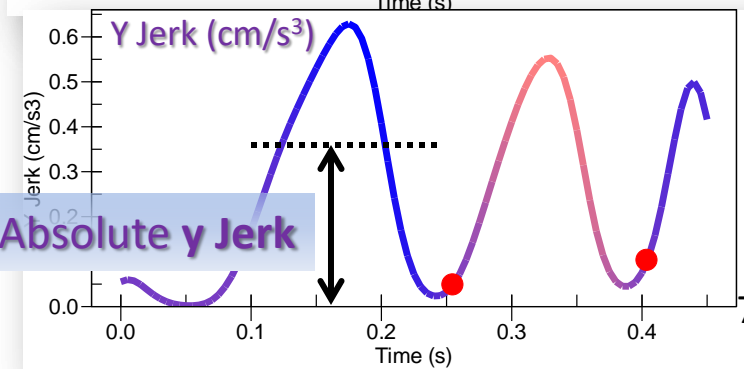
2. Dynamic Features



2a. Dynamic Features

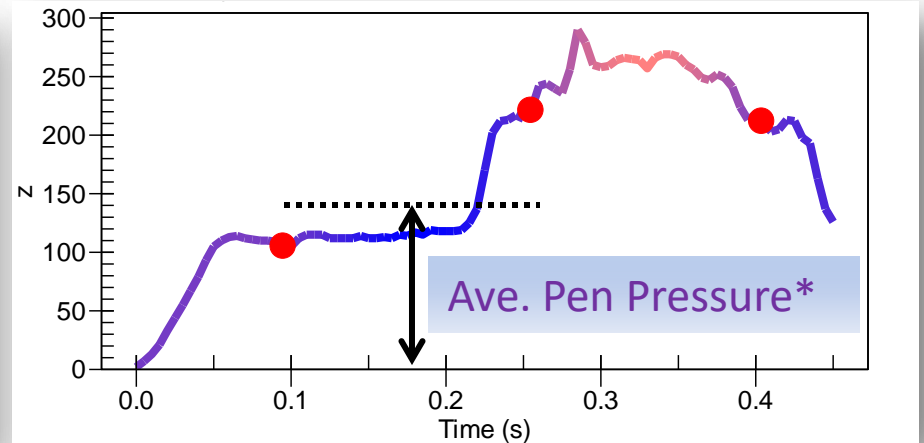
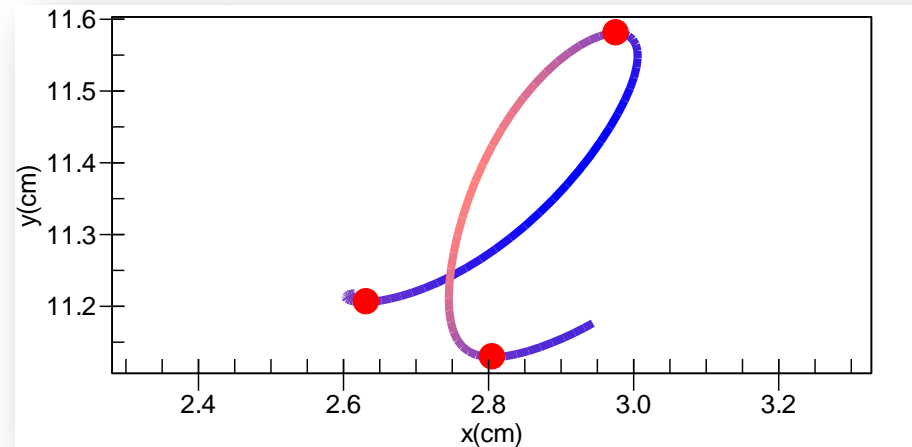


Peak y Acceleration
(=Largest absolute of pos. and neg. acceleration within 1 stroke)

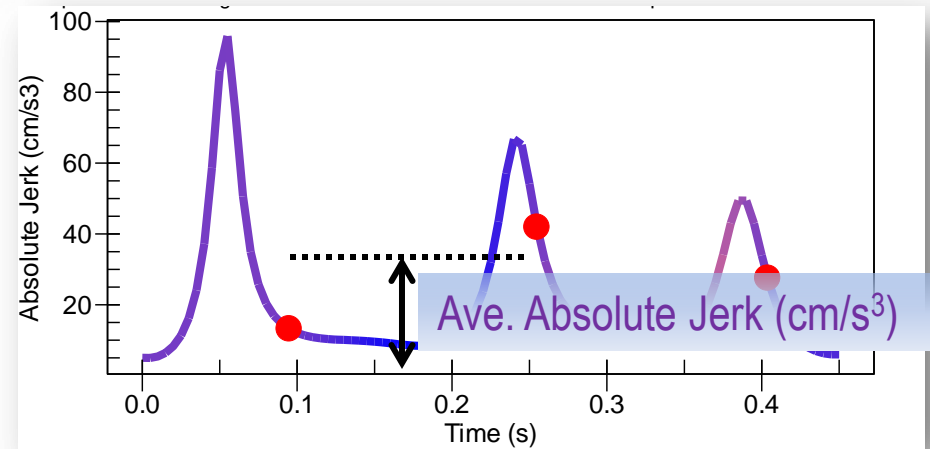


Average Absolute y Jerk

2b. Dynamic Features



* Unit is tablet's pressure units



3a. Dysfluency Features

- Normalized jerk per Stroke =

$$\{1/2 * \int dt \text{ Jerk}^2(t)\} * \text{duration}^5 / \text{size}^2$$

$$\text{Units: } s^1 (cm^1 / s^{-3})^2 * s^5 * cm^{-2} = \text{Unit free}$$

A maximally smooth, straight harmonic stroke yields 7.75 ($=\pi^3/2^2$).

A perfectly circular, constant-velocity stroke yields 10.96 ($=\pi^3/2^{1.5}$).

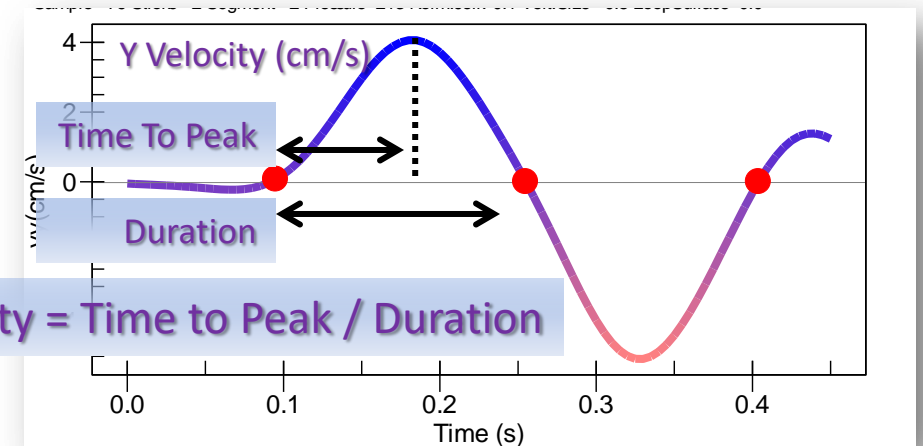
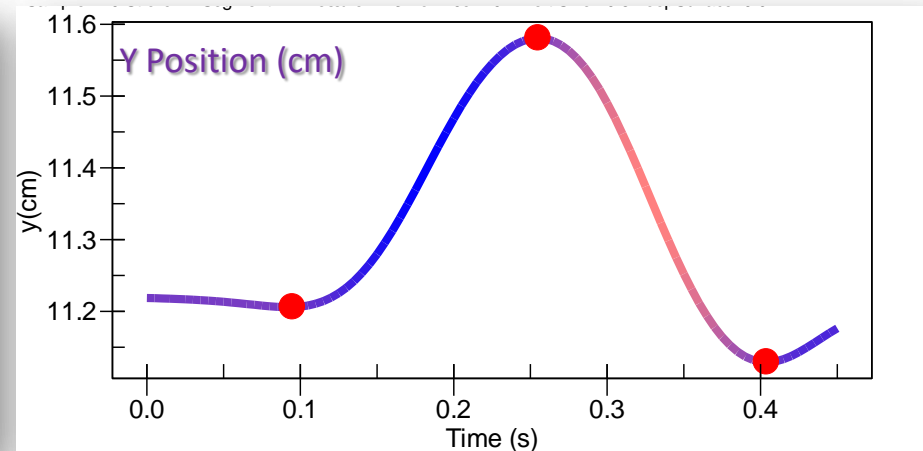
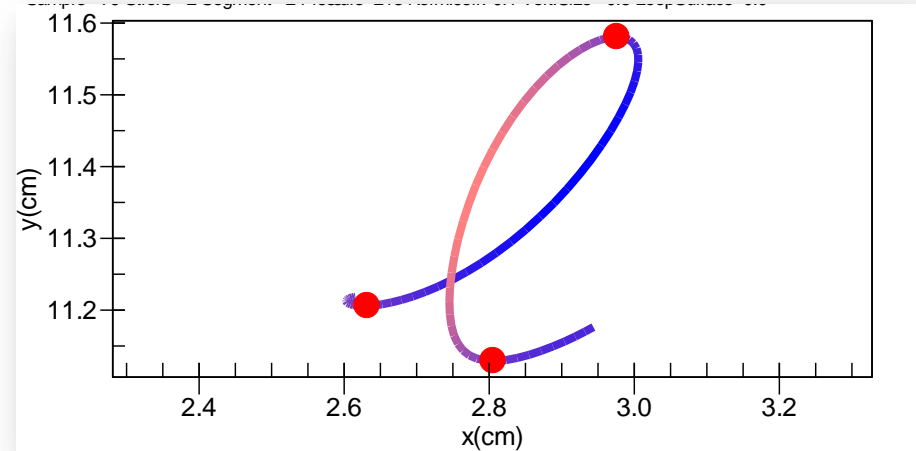
Jerk can also be defined in the y-direction only: yJerk.

Teulings, H.L., Contreras-Vidal, J.L., Stelmach, G.E., and Adler, C.H. (1997). Coordination of fingers, wrist, and arm in Parkinsonian handwriting. *Experimental Neurology*, 146, 159-170.

3b. More Dysfluency Features

- Relative Time to Peak y Velocity
- Number of Peak Acceleration Points / Stroke

3c. Dysfluency Features



Relative Time To Peak y Velocity = Time to Peak / Duration

3b. More Dysfluency Features

Requires submovement analysis:

Rightclick your experiment >Properties >Processing >Segmentation >Check:
Submovement analysis.

- Frequency of Secondary Submovements
- Relative Duration of Primary Submovement
- Relative Size of Primary Submovement

4. Additional Features

- Plug-ins (MovAlyzeR “External Apps”)
 - Batch file, calling any executable
 - Matlab script