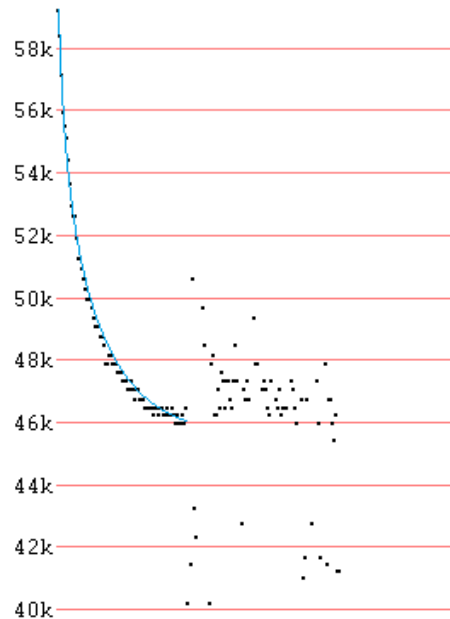


Extracting pulses from Zero Crossing

September 9, 2018

We may be able to write an algorithm that constructs pulse objects from ZC data using linear interpolation like so:



I think the best way to do this is to graph the absolute value of the change in y from dot to dot. I don't know enough math to recommend the best way of doing this. For the purpose of this proposal I'll assume getting the information by iterating through the file one dot at a time.

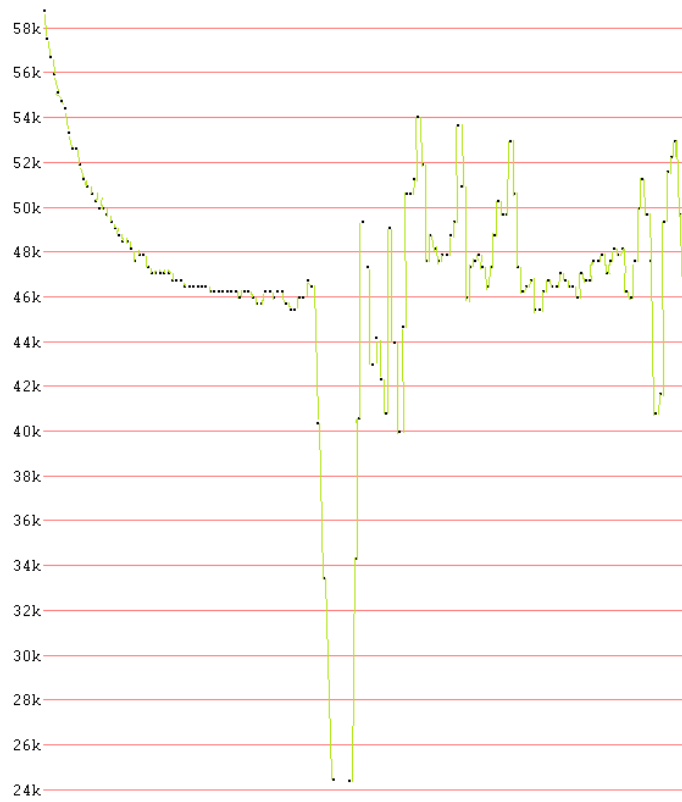


Figure 1: Green lines represent the dy from point to point

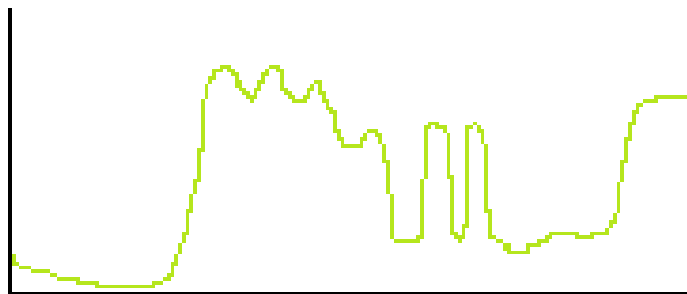


Figure 2: A rough approximation of what the graph of Figure 2 might look like

By looking for areas in the derivative with low rates of change, we can identify candidates for generating pulse objects. Candidates could be found by ignoring areas with high rates of change and by looking for turning points.

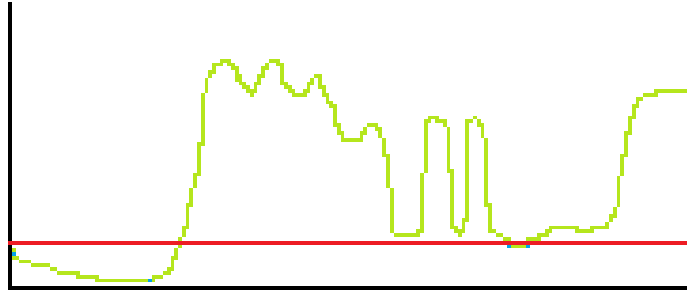


Figure 3: Areas between two blue turning points and below the red cutoff line are candidates

This initial list of candidates can be further refined by examining things like duration of pulse, smoothness of rate of change, etc.



Figure 4: The orange area is too short to be considered a pulse

Now that the pulse has been isolated, we can use some form of linear interpolation, such as a Bézier curve, to generate a continuous function representing the pulse as shown in Figure 1. The pulse object would then look something like

Pulse	
Curve	String
Dots	int[]