The data is imported from an Excel spreadsheet into a Matrix in Mathcad.

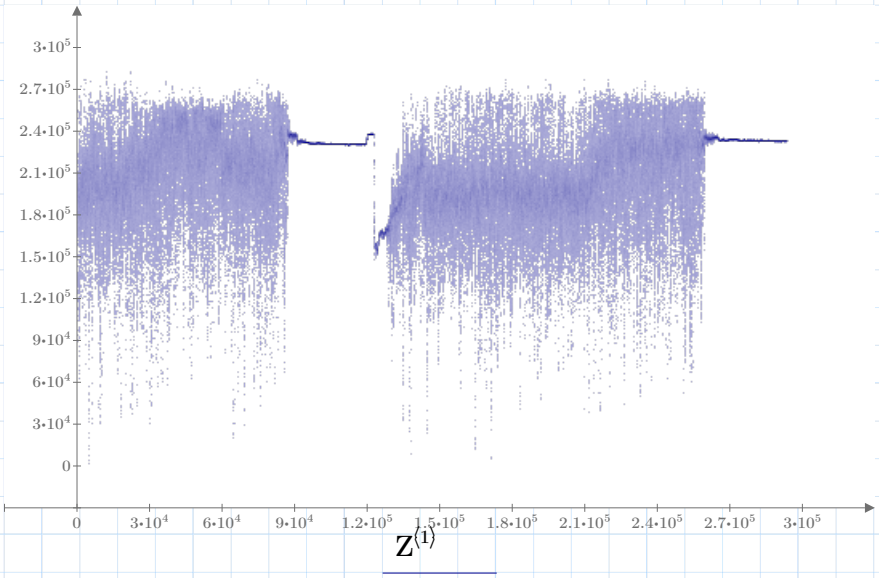
STEP 1. IMPORT THE DATA FROM EXCEL TO A MATRIX, Z, IN MATHCAD.

$Z := \mathrm{READEXCEL}(\text{".\StrayCurrentData\_03.xlsx"}, \text{"Data!A1:B293719"})$

STEP 2. SELECT A REFERENCE POTENTIAL TO EVALUATE ANODIC AND CATHODIC SHIFTS.

$E_{ref} := -1$

STEP 3. PLOT ALL THE DATA (THIS SET IS FROM 48 HOURS AND MEASURED EVERY SECOND)



STEP 4. CALCULATE THE ANODIC AND CATHODIC PARTS OVER THE FULL RANGE.

Lo_{match} selects all elements of the matrix that are greater than E_{ref}

Hi_{match} selects all elements of the matrix that are less than E_{ref}

$Lo_{match} := \text{match}\left(E_{ref}, \text{Z}, \text{“gt”}\right)$ $\quad$ $Hi_{match} := \text{match}\left(E_{ref}, \text{Z}, \text{“lt”}\right)$

$Lo_{count} := \text{rows}\left(Lo_{match}\right) = 3.208 \cdot 10^{5}$ $\quad$ $Hi_{count} := \text{rows}\left(Hi_{match}\right) = 2.659 \cdot 10^{5}$

$Lo := \text{vlookup}\left(E_{ref}, \text{Z}, 0, \text{“gt”}\right)$ $\quad$ $Hi := \text{vlookup}\left(E_{ref}, \text{Z}, 0, \text{“lt”}\right)$

$Lo_{mean} := \text{mean}\left(Lo\right) = -0.788$ $\quad$ $Hi_{mean} := \text{mean}\left(Hi\right) = -1.673$

$Ratio := \dfrac{Hi_{count}}{Lo_{count}} = 0.829$ $\quad$ $\dfrac{Hi_{mean}}{Lo_{mean}} = 2.123$

$Lo := \text{match}\left(E_{ref}, \text{Z}, \text{“gt”}\right)$ $\quad$ $Lo' := \text{vlookup}\left(E_{ref}, \text{Z}, 1, \text{“gt”}\right)$ $\quad$ $Lo'' := \text{vlookup}\left(E_{ref}, \text{Z}, 0, \text{“gt”}\right)$

$NewLo := \text{augment}\left(Lo'', Lo'\right)$ $\quad$ $End := \text{last}\left(NewLo^{\langle 1 \rangle}\right) = 2.707 \cdot 10^{4}$

$\max\left(NewLo^{\langle 0 \rangle}\right) = -0.096$ $\quad$ $\min\left(NewLo^{\langle 0 \rangle}\right) = -0.999$

$$NewLo = \begin{bmatrix} -0.648 & 300 \\ -0.773 & 305 \\ -0.651 & 306 \\ -0.649 & 307 \\ -0.672 & 308 \\ -0.687 & 523 \\ -0.744 & 524 \\ -0.842 & 525 \\ -0.811 & 577 \\ -0.987 & 733 \\ -0.974 & 734 \\ -0.785 & 990 \\ -0.727 & 991 \\ -0.528 & 992 \\ -0.439 & 993 \\ -0.483 & 994 \\ & \vdots \end{bmatrix}$$

$Q_a := Lo_{count} \cdot 1\ s$ $Q_c := Hi_{count} \cdot 1\ s$

T_{max} to be determined. It is the longest continuous period of anodic readings. NewLo has only the extracted values of anodic readings and the row numbers are not continuous. Each row respresents a 1 second intervals, so one row = 1 second.

Criterion calculation:

$$Q := \frac{(|Q_c| - |Q_a|)}{|Q_a|} = -0.171 \qquad Q' := 0.004 \cdot s^{-1} \cdot T_{max} = ?$$