# Opto-Stats Documentation

## Files

***MaxMinSorter.m***

Defines, sorts and records crests and troughs of waves as well as variables ready for obtaining stats

***OptoStats.m***

Calculates statistics for 1st wave and average values of subsequent waves and writes to file.

## Instructions

* Run ***MaxMinSorter.m***
* Input preferences in dialogue box

**Input filename:** Full name of file to be read.

**Time Frame Length:** Size of one frame in seconds.

**Pixel width**: Width of one pixel in microns.

**No. Rows:** Number of rows of data to be read from file (not including title).

**Local max/min separation:** Minimum distance between local maxima/minima. Helps prevent minor peaks/dips being represented as extreme points of a wave.

**Output Filename (1st wave**)**:** File recording stats for the first wave only.

**Output Filename (mean values):** File recording average of stats for all waves (excluding 1st and last).

* Check plots of maxima and minima are correct. Make sure all except the last peak have a red \*. And all except the first and last troughs have a blue \* (Figure 1). If there are more than one of the same colour \* together then something has gone wrong! If the first \* on the left is blue then something has also gone wrong!

Chart, line chart

Description automatically generated

Figure : Correct order

Chart, line chart

Description automatically generated

Figure Wrong order!

* If the plots are incorrect, try adjusting the **Local max/min separation** value. If they are still not correct then let me know (david.hardman@ed.ac.uk).
* Run ***OptoStats.m***
* Stats written to file are as follows:

Accel\_Disp\_Wave\_1: Displacement during activation of first wave.

Accel\_Time\_1: Time from origin until crest of first wave (activation time).

Accel\_Rate\_Wave\_1: ‘Speed of activation’ of first wave.

Decel\_Disp\_Wave\_1 : Displacement during deceleration for first wave.

Decel\_Time\_1: ‘Decay time’ for first wave

Decel\_Rate\_Wave\_1: Speed of decay for first wave

Wavelength\_Wave\_1: Length of first wave (seconds)

Mean\_Accel\_Disp: Average displacement during activation

SD\_Accel\_Disp: Standard deviation displacement during activation

Mean\_Decel\_Disp: Average displacement during deceleration

SD\_Decel\_Disp: S.D. displacement during deceleration

Mean\_Accel\_Time: Average activation time

SD\_Accel\_Time: S.D. activation time

Mean\_Decel\_Time: Average decay time

SD\_Decel\_Time: S.D. decay time

Mean\_Accel\_Rate: Average : ‘Speed of activation’

SD\_Accel\_Rate: S.D. : ‘Speed of activation’

Mean\_Decel\_Rate: Average speed of decay

SD\_Decel\_Rate: S.D. Speed of decay

Mean\_Wavelength: Average wavelength (seconds)

SD\_Wavelength: S.D. wavelength (seconds)

Mean\_Frequency: Average waves/second

SD\_Frequency: S.D. waves/second