# **Dynamotype Atlas**

## **Overview**

This atlas provides a comprehensive classification of 16 seizure dynamotypes based on the Saggio et al. model. It includes descriptions of the different classes of seizures, 5 sample state-space trajectories, 3 noise levels, and their onset and offset bifurcation dynamics. The atlas also introduces a novel hybrid method for trajectory generation that refines previous classifications.

## **Structure**

The document contains:

* A detailed explanation of three trajectory generation methods:
  + **Hysteresis Bursters**
  + **Slow-Wave Bursters**
  + **Piecewise Slow-Wave Bursters**
* Individual descriptions of each seizure class, including bifurcation types and state-space representations.
* Illustrations of 5 state-space trajectories and corresponding time-series behavior.

## **Supplementary Code**

This atlas includes code to generate figures and simulate seizure trajectories. The code allows users to:

* Replicate the 330 simulated seizures found in the atlas.
* Simulate seizures based on different onset and offset bifurcations.
* Generate visualizations of state-space paths and time-series representations.

## **Usage**

1. **Data Preparation**: Ensure that any required datasets or parameter files are available.
2. **Running the Simulations**: Execute the provided scripts to generate seizure simulations.
3. **Visualizing Results**: Use the plotting functions to compare different seizure classes.

## **Supplementary Seizures**

This atlas includes a mat file of all 330 seizures named seizure\_atlas.mat. Below is a table that shows the specified dynamotype within indices 1-330.

| **Index Range** | **Dynamotype** |
| --- | --- |
| 1–15 | SN/SNIC |
| 16–30 | SN/SH |
| 31–45 | SN/SH variant 1 |
| 46–60 | SN/SH no DC |
| 61–75 | SN/Sup |
| 76–90 | SN/Sup variant 1 |
| 91–105 | SN/Sup variant 2 |
| 106–120 | SN/FLC |
| 121–135 | SNIC/SNIC |
| 136–150 | SNIC/SH |
| 151–165 | SNIC/Sup |
| 166–180 | SNIC/Sup variant 1 |
| 181–195 | SNIC/FLC |
| 196–210 | Sup/SNIC |
| 211–225 | Sup/SNIC variant 1 |
| 226–240 | Sup/SH |
| 241–255 | Sup/Sup |
| 256–270 | Sup/FLC |
| 271–285 | Sub/SNIC |
| 286–300 | Sub/SH |
| 301–315 | Sub/Sup |
| 316–330 | Sub/FLC |