

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