Phase-locking behaviour and Lyapunov exponents in brain networks of epileptic patients

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Characterization of neuronal connectivity in human brains before, during, and after an epileptic seizure uses different signal theoretic and non-linear methods to analyze intracranial electroencephalogram (iEEG) data from multiple seizure types. Changes in brain neuronal network results in changes in phase synchronization. We have analyzed phase synchronization from intracranial EEG data, which entailed applying the Hilbert transform to both unfiltered and frequency-filtered data, calculating phase-locking and amplitude-locking values, cross-frequency coupling linking different brain regions, and image processing. Furthermore, since the iEEG data are non-linear representing a dynamical system, we have investigated the deterministic chaos with Lyapunov exponents. In this poster, we report the results of our work and draw preliminary conclusions on the seizure behaviour.

References

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