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Analysis, Reconstruction, and Modeling of the Electrical Signal of the Weakly Electric Fish *Apteronotus Leptorhynchus* LORENZO SEWANAN, KENT DUNLAP, Trinity College — The weakly electric fish *Apternotus leptorhynchus* uses approximately sinusoidal electrical signals to electrolocate and electrocommunicate. In particular, the complex electrical signals which are generated during dynamic interactions have been shown to impact the behavior and physiology of interacting fish. In order to study the specific features of these electrical signals that are biologically relevant, signals collected from fish under diverse conditions are analyzed using temporal and spectral techniques, specifically amplitude variation and frequency variation. Having characterized specific features of the signals, computational methods are then used to construct signals to mimic real electric fish signals. Constructed signals show close matching in relevant features when analyzed in the same manner as the original signals. From a different perspective, a two-dimensional dynamic model is formulated to simulate the generation of amplitude modulation in these signals based on the motion of a particle sampling a generalized field of time-varying points and found to generate some features of experimental electric fish signals. Work continues on both analysis, reconstruction, and modeling as well as actual playback experiments to determine the impact of these signals to influence fish neuroethology.

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