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NEW METHODS FOR NONLINEAR TRACKING AND NONLINEAR CHAOTIC SIGNAL PROCESSING

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NEW METHODS FOR NONLINEAR TRACKING AND NONLINEAR CHAOTIC SIGNAL PROCESSING

As a first step we have developed a number of computer programs.

(a) Programs to generate various kinds of signals.

(b) A program to normalize signals.

(c) A program to determine relative levels of assumed signals from a signal that is the sum of several signals.

(d) A program to calculate the density of an attractor for a "simple" signal in a reconstructed phase space.

(e) A program to construct the density of a "compound" signal in reconstructed phase space. Compound means it is the sum of two or more separate signals.

(f) A program to determine which signals make up a particular compound signal. This particular program so far uses the simplest version of our algorithm.

We have tested the program in (f) above on some examples. The simplest algorithm already works to identify signals when there are roughly equal amounts of two different signals or one signal and an approximately equal amount of noise. That version of the algorithm doesn't work satisfactorily when the ratio of strengths is 10 to 1, *i.e.*, if the noise is ten times the signal. We expect that the refinements that are not yet tested will extend the range. We have also been developing the tools to decide when one has successfully identified a signal. We expect soon to test the algorithms on a variety of combinations of unknown signals and unknown relative strengths. We will begin work shortly on the tracking algorithms.