Abstract Submitted
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**Non-linear Dynamics and ECG Trace Prediction** WILLIAM OLDHAM, Retired — The methods of non-linear dynamics for time series prediction are applied to electrocardiogram traces. In this method the embedding dimension and the embedding dimension (d) and the correlation dimension, we can construct an array of vectors of dimension d. It is assumed that the system under analysis is a dynamical system described by an unknown set of n first order differential equations. At this point a learning algorithm and a prediction algorithm are needed to learn the system dynamics and predict future behavior. The approach used here is to expand the time series vectors in a set of orthogonal polynomials. It is necessary to select a set of d-dimensional polynomials. Theoretically, any set of orthogonal polynomials could be used, but our choice of polynomials is what might be called the set of "natural polynomials" as they are computed from the time series itself. I use a different way of generating the polynomials than those of earlier works. Earlier works presented computational schemes that seemed difficult to extend to higher dimensions and polynomial degree. The technique used here is natural and is easily extended to higher dimension and polynomial degree. It also yields a simplified way to refer to the polynomials. The expansion coefficients are then determined in the usual way and used to predict future behavior. Some limited results are presented and future work is

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