

1086-G5-126

Garret E. Sobczyk* (garret_sobczyk@yahoo.com). *The Spectral Basis of a Linear Operator*.

The idea of a spectral basis first arises in modular or clock arithmetic but is an even more powerful tool in linear algebra and numerical analysis. The spectral basis of a linear operator, uniquely determined by its minimal polynomial, exhibits the macro structure of a linear operator in terms of the basic building blocks of mutually annihilating idempotents and nilpotents which determine its generalized eigenspaces. These ideas are only part of a much larger program developed by the author in his new book, "New Foundations in Mathematics: The Geometric Concept of Number" (Birkhauser 2012), which uses geometric (Clifford) algebra to present an innovative approach to elementary and advanced mathematics. Starting with linear algebra, geometric algebra offers a simple and robust means of expressing a wide range of ideas in mathematics, physics, and engineering. (Received July 26, 2012)