Spring 4-2016

PEA System Modeling and Signal Processing for Measurements of Volume Charge Distributions in Thin Dielectric Films

Lee H. Pearson
JR Dennison
Utah State University
Erick W. Griffiths
A. C. Pearson

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Pulsed Electro-Acoustic (PEA) system capabilities that incorporate:

- Improved signal processing tools for increased signal/noise ratios (SNR)
- Pulsed Electro-Acoustic (PEA) measurement techniques are nondestructive

For each element in the wavelet, the average and standard deviation are calculated from which the coefficient of variation (CV=std/avg) is calculated.

Other wavelets can be similarly derived. In general, there are an infinite number, but only a few are needed in practice.

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In summary, signal processing and modeling tools have been developed, debugged, and proven out, and have been found to be beneficial in cleaning up waveforms (see Fig. 5) and analyzing their meaning and content.

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**References**

2. Bear River City, Utah
3. Box Elder Innovations, LLC
4. Utah State University
5. PEA System Development for Measurement of Volume Charge Distributions in Thin Dielectric Films
7. Figure 1. Flow Diagram Showing Signal Processing and Data Analysis Process
8. Figure 2. Graphical Representation of Split Spectrum Processing Method
9. Figure 3. Conceptual diagram showing a generic PEA setup with a charged dielectric film, electrodes, sensor, and basic equipment components
10. Figure 4. Drawing showing additional wavelets including additional reflecting wavelets and wavelets coming from induced charge layers
11. Figure 5. Comparison of Measured Waveform and Model Calculation

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This work was supported by Small Business Technology Transfer Research (STTR) Phase I and Phase II funding from the Air Force Research Laboratory, Kirtland AFB, Albuquerque, NM, USA.