

**Friday April 17th**  
**5 pm**  
**621 Skytop**  
**Syracuse University**



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**IEEE**

## **Interpolation/Extrapolation of Radar Cross-Section (RCS) Data in the Frequency Domain Using the Cauchy Method**

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The Cauchy method is applied to interpolate/extrapolate the radar cross-section (RCS) data which is amplitude-only data over a given frequency band and/or the far field radiation pattern. This is accomplished by approximating the amplitude-only data by a ratio of two polynomials, the coefficients of which are calculated by using the total least squares (TLS) implementation of a singular value decomposition (SVD) technique so as to properly estimate the dimension of the null space. By applying the Cauchy method, the power spectrum of an electromagnetic system is represented by a set of symmetric pole and zero pairs in the s-plane. Once these coefficients in the numerator and the denominator polynomials in the Cauchy method are computed using the amplitude-only data, the response can be interpolated/extrapolated over other frequencies of interest.

Numerical examples are presented to illustrate the applicability of the Cauchy method in interpolating/extrapolating RCS data over a frequency band, including a method of generating the phase response from the amplitude-only data. Once the non-minimum phase response is generated the temporal response can easily be generated.



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