Abstracts

Application of the Cauchy method for extrapolating/interpolating narrowband system responses

R.S. Adve, T.K. Sarkar, S.M. Rao, E.K. Miller and D.R. Pflug. "Application of the Cauchy method for extrapolating/interpolating narrowband system responses." 1997 Transactions on Microwave Theory and Techniques 45.5 (May 1997, Part II [T-MTT]): 837-845.

In this paper, it is shown that Cauchy's method can be used effectively to interpolate/extrapolate narrow-band system responses. The given information can either be theoretical datapoints or measured experimental data over a band. For theoretical data extrapolation or interpolation, the sampled values of the function and, optionally, a few of its derivatives have been used to reconstruct the function. For measured data, only measured values of the parameter are used to create broadband information from limited data as derivative information is too noisy. Cauchy's method assumes that the parameter to be extrapolated/interpolated, as a function of frequency, is a ratio of two polynomials. The problem is to determine the order of the polynomials and the coefficients therein. The method of total least squares (TLS) has been used to solve the resulting matrix equation involving the coefficients of the polynomials. Typical numerical results have been presented to show that reliable interpolation/extrapolation can be done for various system responses.

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