Abstracts

Autoregressive (AR) and Autoregressive Moving Average (ARMA) Spectral Estimation Techniques for Faster TLM Analysis of Microwave Structures

C. Eswarappa and W.J.R. Hoefer. "Autoregressive (AR) and Autoregressive Moving Average (ARMA) Spectral Estimation Techniques for Faster TLM Analysis of Microwave Structures." 1994 Transactions on Microwave Theory and Techniques 42.12 (Dec. 1994, Part II [T-MTT] (1994 Symposium Issue)): 2407-2411.

Autoregressive (AR) and autoregressive moving average (ARMA) techniques have been successfully implemented in conjunction with the transmission line matrix (TLM) method for efficient time-domain analysis of microwave structures. The AR technique can be used to compute the full time-domain response from a relatively short segment of the early TLM response. It was found that the least-square technique of estimating the AR parameters requires a shorter time record than solving Yule-Walker equations through the Levinson-Durbin algorithm. The ARMA technique can be used to compute the scattering parameters of microwave structures without using the discrete Fourier transform. A recursive least square covariance ladder algorithm has been used for ARMA modeling. Both AR and ARMA models have been validated by applying them to waveguide and suspended substrate stripline filters. With these techniques, the speed of the computationally intensive TLM algorithm can be increased up to five times.

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