Abstracts

Analysis of guided wave structures using 3-D envelope-finite element (EVFE) technique

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A novel three-dimensional Envelope-Finite Element (EVFE) technique is proposed to solve the transient response of an electromagnetics problem. EVFE simulates the signal envelope rather than the original signal waveform by de-embedding the signal carrier from the time-domain wave equation. The sampling rate of the time-domain waveform is only governed by the Nyquist rate of the envelope signal instead of the carrier signal in the unconditionally stable FETD method. Compared to the traditional FDTD and FETD methods, the computational cost can be dramatically reduced when the signal envelope and carrier ratio is very small. This technique is implemented to solve a microwave guided structure with dielectric post discontinuity. The accuracy and efficiency is demonstrated and compared with the unconditionally stable FETD method.

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