# Abstracts

## The generation of optimal microwave topologies using time-domain field synthesis

We present a novel approach to the design of microwave structures using time-domain field synthesis. A standard transmission-line matrix (TLM) electromagnetic analysis of the starting geometry yields the structure response and the field distribution on the optimizable boundary parts. A number of characteristic frequencies equal to the number of designable parameters of the structure are determined first. For narrow-band structures, these frequencies may be natural resonance frequencies. For wide-band structures, we create appropriate resonance conditions. The target response of the structure allows us to identify the desirable values of these frequencies. For each parameter, a synthesis phase is then performed. In this phase, the optimizable boundary parts are replaced by matched TLM sources that inject sampled sinusoidal streams at the desired characteristic frequency. The TLM field model generates an electromagnetic field pattern. The synthesized geometry is obtained by examining the envelope of that field pattern. Our approach is illustrated by means of several examples.

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