

From Microwaves to Terahertz: Simulation Requirements for Devices and Circuits

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As clock speeds increase and integrated circuits become denser, conventional lumped-circuit models lose accuracy and are replaced with distributed models. At upper millimeter waves and moving into THz bands, even distributed models may not be sufficiently accurate for certain applications. Many modern applications require coupling semiconductor-device models with appropriate electromagnetic models to incorporate wave-propagation effects and accurately predict the component response. The challenges of developing coupled electromagnetic and semiconductor simulators are in selecting the appropriate models to analyze the desired phenomena without unnecessarily increasing the computational load. In this talk, several coupled simulation tools will be presented. The advantages and limitations of each simulator will be discussed.