

Computational Electromagnetics in Solving Real-World High-Speed EMI/EMC and Packaging Problems

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Abstract

In the past 10 years, circuit boards and packages, the media that is overwhelmingly used to transport and process electronic signals, have become smaller and denser. Over the same period, the clock frequency has reached the microwave band with higher order harmonics reaching the X-band and beyond. With these factors combined, the design of the “circuit” becomes a problem of transmission lines, cross-talk, dispersion, wave-matter interaction, propagation, inductive coupling,...etc. Classical circuit and package designers are confronted with an overwhelming task of accounting for all these factors that strongly affect the form and arrival time of the signal and whether the signal causes any problems elsewhere in the system. Antennas and propagation scientists and engineers, on the other hand, are fully comfortable with such physical phenomena yet are disjointed from the language and challenges faced in circuit designs and from the device behavior that leads to all such problems and challenges. This course introduces classical antenna and propagation folks to the world of electromagnetic compatibility, interference and packaging with computational electromagnetics as the medium of communication. Students can expect to become familiar with important problems facing the industry and the role and challenges of using numerical modeling to solve such problems.