Board Planes Analysis for Power Integrity

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Abstract

Power delivery is a major challenge in present-day systems. This challenge is expected to increase in the next decade as systems become smaller and new materials are introduced into packages and boards. Planes form an integral part of a power delivery system (PDS). They provide charge to the switching circuits at high frequencies and support return current of the signal lines. Planes pairs are widely used on high-speed printed circuit boards. Planes are capacitive at low frequencies and become inductive at high frequencies. Since lateral dimensions of planes are multiple of λ, they behave as spatially distribute systems and resonate at higher frequencies due to the reflections from the open edges. The goal of this article is to approach an efficient numerical approach based on the finite difference method (FDM) to model the power/ground plane in a printed circuit board in frequency domain.