

### **“Extending the capabilities of the dual-grid finite-difference time-domain method”**

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**Abstract** – In this paper, improvements of the dual-grid finitedifference time-domain (DG-FDTD) method are proposed. This multiresolution approach is particularly suitable for the simulation of surrounded antenna problems. By successively combining two finite-difference time-domain (FDTD) simulations with different resolutions, it allows the evaluation of the environment effects on the radiated fields, and it also gives information on the antenna input impedance. In this paper, we propose two different techniques to extend the DG-FDTD capabilities. The first one consists of a correction procedure. Its application to a lens antenna analysis exhibits accurate results while providing a computation speedup of 16.7. The second technique consists of its hybridization with the multiple-region FDTD to make the simulation of transmission problems possible. A study involving two ultra-wide band antennas shows the relevance of the hybrid method that allows a fast and accurate characterization of scattering parameters.