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Time-Domain Simulation of Thin Material Boundaries and Thin Panels Using Digital Filters in TLM

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Abstract: In this paper, the design and implementation of digital filters for the time-domain simulation of electromagnetic wave interaction with thin material boundaries and thin panels using the Transmission-Line Modelling (TLM) method are described. The technique is applied to the description of thin ferrite layers placed on the external boundaries of the modelled space and to plastic panels placed inside the modelled space. The approach is validated using one-dimensional examples having analytic solutions. Finally, the results obtained for the Shielding Effectiveness (SE) of a practical equipment enclosure are presented to demonstrate the utility of the method in Electromagnetic Compatibility (EMC) prediction.

Key Words: Transmission line matrix, shielding effectiveness, digital filters, thin material boundaries

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