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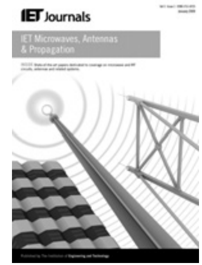

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Source-model technique analysis of transient electromagnetic scattering by dielectric cylinders

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Abstract: This study considers the application of the source-model technique to the solution of the problem of electromagnetic scattering by an arbitrarily shaped dielectric cylinder illuminated by a transient plane wave. The technique is utilised to study the scattering from a dielectric cylinder of circular cross-section and from a cylindrical void of the same cross-section lying in a dielectric medium. The effect of numerical parameters on accuracy and stability is studied and guidelines as to the choice of source location and their number are given. The scattering from a dielectric circular cylinder is then compared with the scattering by a cylinder of a rectangle capped by semi-circles cross-section, and the results are interpreted from a physical point of view.