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Abstract:We consider the inverse-scattering problem of retrieving the structural parameters of a stratified medium consisting of dispersive materials, given knowledge of the complex reflection coefficient in a finite frequency range. It is shown that the inverse-scattering problem does not have a unique solution in general. When the dispersion is sufficiently small, such that the time-domain Fresnel reflections have durations less than the round-trip time in the layers, the solution is unique and can be found by layer peeling. Numerical examples with dispersive and lossy media are given, demonstrating the usefulness of the method for, e.g., terahertz technology. © 2012 Optical Society of America.
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