1172-35-35 **Thuy T. Le*** (tle55@uncc.edu), Department of Mathematics and Statistics, University of North Carolina at Charlotte, Charlotte, NC. *A Carleman-based reconstruction method for a 1D coefficient inverse problem with time-dependent experimental data.*

To compute the spatially distributed dielectric constant from the backscattering computationally simulated and experimentally collected data, we study a coefficient inverse problem for a 1D hyperbolic equation. To solve this inverse problem, we establish a new version of the Carleman estimate and then employ this estimate to construct a cost functional, which is strictly convex on a convex bounded set of an arbitrary diameter in a Hilbert space. The strict convexity property is rigorously proved. This result is called the convexification theorem and it is the central analytical result of this paper. Minimizing this cost functional by the gradient descent method, we obtain the desired numerical solution to the coefficient inverse problems. We prove that the gradient descent method generates a sequence converging to the minimizer starting from an arbitrary point of that bounded set. We also establish a theorem confirming that the minimizer converges to the true solution as the noise in the measured data and the regularization parameter tend to zero. Our method delivers a good approximation of the exact solution without requiring a good initial guess. Results of numerical studies of both computationally simulated and experimentally collected data are presented. (Received August 09, 2021)