LEARNED INVERSE SCATTERING INSPIRED BY RECURSIVE LINEARIZATION

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Inverting scattered acoustic or electromagnetic waves is a fundamental challenge in medical imaging, geophysical exploration, sonar and radar detection, and nondestructive testing of materials. However, accurately and stably recovering an inhomogeneous medium from far-field scattered wave measurements is computationally difficult due to the nonlinear and non-local nature of the forward scattering process. I will describe a neural network and training method to approximate the inverse map from far-field scattered wave measurements at multiple frequencies. Our solution is inspired by the recursive linearization method, which separates the reconstruction problem into a series of simpler frequency-dependent sub-problems. We compare our recursive linearization-inspired architecture and training method with other neural network methods, including single-frequency and other multi-frequency methods. This is joint work with Owen Melia, Olivia Tsang, Vasileios Charisopoulos, Yuehaw Khoo, and Jeremy Hoskins.