Imaging water supply networks and vocal tracts

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Abstract

I will present some of my past and current work involving water supply networks, vocal tracts and other applications. The underlying mathematical model is the one dimensional wave equation and the inverse problem asks for the reconstruction of the wave speed or first order coefficient. What makes the problem interesting is that despite "being solved" in a general setting over 50 years ago there has not been much talk about implementations or collaboration with applied scientists. There are also interesting mathematical questions that still remain open, such as what is the simplest or lowest energy measurement that's required to determine vocal tract length or volume. Is is possible to determine these from passive measurements, like speech? Or is it required to send a controlled input wave and listen to the echo?