We present a novel time-domain analysis of a wave-structure interaction problem involving an acoustic wave propagating through a fluid in an unbounded domain interacting with an elastic solid with piezoelectric properties. The solid is initially at rest, and when the acoustic wave interacts with the solid it initiates an elastic wave coupled with an electric potential. While previous analysis has relied on the use of transforms to move the equations to the frequency domain, our analysis allows us to do everything in the time domain. Our theoretical results allow us to use data with less regularity in time than previous results.

In addition to analyzing the abstract problem, we also consider a discretized version of the problem which uses Finite Elements to discretize the solid and Boundary Elements to discretize the fluid. We will also present numerical experiments which we hope will illustrate the validity of our analysis and regularity results. (Received January 16, 2017)