1154-VN-2179 **Emma J Moore*** (emma.moore379@topper.wku.edu), 1906 College Heights Hill Blvd, Department of Mathematics, Western Kentucky University, Bowling Green, KY 42101, and **Ahmet Ozkan Ozer** (ozkan.ozer@wku.edu), 1906 College Heights Hill Blvd, Department of Mathematics, Western Kentucky University, Bowling Green, KY 42101. *Finite difference approximations for controlling hyperbolic-type partial differential equations of a piezoelectric system.* Preliminary report.

Semi-discretized Finite Difference approximations for a system of wave-type partial differential equations (PDE), modeling vibrations on a piezoelectric beam, are considered. It is shown that these approximations do not mimic the observability and/or stabilizability features of the PDE. This is mainly due to the loss of the uniform gap among the eigenvalues of the approximated finite dimensional model. To obtain a uniform gap, and therefore an exponential stability result for the closed-loop system with a feedback controller, we consider an indirect filtering technique which involves adding viscosity terms to the PDE. After filtering, as the mesh parameter goes to zero, the approximated solution space covers the whole infinite-dimensional solution space, and a uniform gap is achieved.

The results will be simulated by a Wolfram Demonstration Project. (Received September 17, 2019)