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Predicting Microwave Cavity Resonances through Machine Learning NATHAN SCHWARTZ, Brigham Young University — Microwave cavities are special resonators consisting of a closed metal structure that confines electromagnetic fields. The purpose of our research is to create and implement various neural networks that can accurately predict electromagnetic field data including resonance modes and frequencies for any given cavity configuration containing two dielectric resonators. To this end, we have generated 50,000 configurations of training data and 10,000 configurations of validation data with their respective solutions. This data was then used to train our neural networks. When data which was not part of the neural network training was used to test the results, the neural network was able predict frequencies, modes, and coefficients to a high degree of accuracy for most regions of our sampled configurations. We are currently developing and implementing functions that will assist us in sampling specific high-error configurations. By sampling more of these configurations, we hope to better train the neural networks in these regions, and thereby reduce the average error in the resulting predictions.

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