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Using Probabilistic Neural Network (PNN) for Extracting Acoustic Microwaves (Bulk Acoustic Waves) in Piezoelectric Material

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Abstract : In this paper, we propose a new method for Bulk detection of an acoustic microwave signal during the propagation of acoustic microwaves in a piezoelectric substrate (Lithium Niobate LiNbO3). We have used the classification by probabilistic neural network (PNN) as a means of numerical analysis in which we classify all the values of the real part and the imaginary part of the coefficient attenuation with the acoustic velocity in order to build a model from which we note the Bulk waves easily. These singularities inform us of presence of Bulk waves in piezoelectric materials. By which we obtain accurate values for each of the coefficient attenuation and acoustic velocity for Bulk waves. This study will be very interesting in modeling and realization of acoustic microwaves devices (ultrasound) based on the propagation of acoustic microwaves.

Keywords : piezoelectric material, probabilistic neural network (PNN), classification, acoustic microwaves, bulk waves, the attenuation coefficient
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