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Experimental validation of ultrasonic guided modes in electrical cables by optical interferometry

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Abstract— In this work, the dispersion curves of elastic waves propagating in electrical cables and in bare copper wires are obtained theoretically and validated experimentally. The theoretical model, based on Gazis equations formulated according to the global matrix methodology, is resolved numerically. Viscoelasticity and attenuation are modeled theoretically using the Kelvin-Voigt model. Experimental tests are carried out using interferometry. There is good agreement between the simulations and the experiments despite the peculiarities of electrical cables.

Index Terms—

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