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A Study of Sensor Array Aperture for Damage Localization in a Plate-Like Structure Using Ultrasonic Guided Waves

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An array of sensors for source localization has been used in various areas of engineering such as seismology, oceanography and radar operations. However, there are limited studies for applications using guided waves. The aperture function which characterizes the sensors topology is fundamental for the performance of the array. In this work we study the array aperture function in the context of dispersive attenuated multimode Lamb waves. Time-frequency beamforming analysis was used to study the effect of the aperture function characteristics. The methodology was implemented on various symmetric and non-symmetric modes generated on an aluminum thin plate. The results show that it is possible to locate the wave source by optimizing the aperture of the array for the dispersive modes generated.