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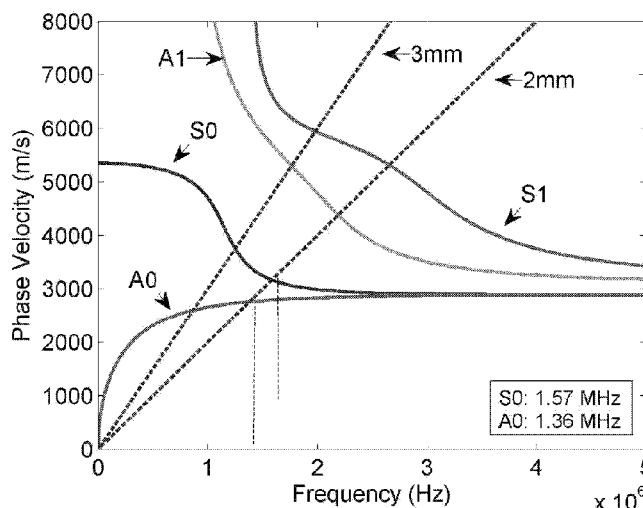
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Fig. 2a



(57) Abstract: A system and method for measuring various weld characteristics is presented. The system and method can comprise a means to measure penetration depth of butt welds in thin plates, for example, using laser generated ultrasounds. Superimposed line sources (SLS) can be used to generate narrowband ultrasounds. A signal processing procedure that combines wavenumber-frequency ($k-\omega$) domain filtering and synthetic phase tuning (SPT) is used to reduce the complexity of Lamb wave signals. The reflection coefficients for different wavelengths corresponding to each wave mode can be calculated. Regression analysis that can include stepwise regression and corrected Akaike's information criterion (AIC) can be performed to build prediction models that use the reflection coefficients as predictors.