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ANALYSIS OF AN ELASTIC HALF-SPACE DISPLACEMENTS GENERATED BY IMPULSE TYPE LOADS

In order to keep roads in a proper state an information about the carrying abilities of their surfaces is highly required. For this aim very often the deflection surface measurements are carried out. Then the obtained experimental data are used in further numerical computations to estimate the carrying abilities of the analyzed constructions. Although the various measurement methods are applied, the most effective belong to the NDT (Non Destructive Testing). However, in order for a proper study of the obtained results, a theoretical background of the problem is required. In addition, a comparison of the experimental data with those obtained via the theoretical and numerical analyses yields the being sought physical (mechanical) parameters of the road surfaces.

In this work a classical axially symmetric Lamb problem is reconsidered [1], [2]. In words, analysis of stress-strain state on a surface being a boundary of an elastic half-space, subjected to an pulse excitation load distributed on the circle surface similar to that investigated by Hertz, is carried out. A being sought solution is obtained in the form of the Laplace and Hankel transformations. Owing to a position of the branch points of the under-integral functions and

the associated poles, an integration contour of the inversed Laplace transformation is modified, and then the numerical analysis is carried out.

The deflections of the elastic half-space boundary (surface) in different surface points and for different pulse function width, as well as different external loads are reported. The conditions for the pulse width, when a quasi-static solution occurs, are formulated.

[1] J.D.Achenbach. *Wave propagation in elastic solids.* New York: American Elsevier Publishing Company. 1973.

[2] J.Awrejcewicz, Yu.Pyryev. *De Saint-Venant principle and an impact load acting on an elastic half- space.* Journal of Sound and Vibration. **264** (2003), no. 1, 245–251.