

## Analytical and numerical modelling of surface acoustic waves in rotating piezoelectric media

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*Abstract:* This paper presents results of analytical and numerical research of surface acoustic waves propagation process in rotating piezoelectric media, taking into account the coupling of physical fields. Various wave parameters such as frequency, phase velocity, wave mode are analyzed and their dependencies on angular velocity is investigated. The results obtained can be used to develop microelectromechanical devices in the field of navigation and signal processing. The relationship between phase velocity and rotation was determined without simplifying assumptions and was compared with previously obtained results from the literature. Dependencies were found for materials of ST-quartz and Lithium niobate (LiNbO<sub>3</sub>). Based on the obtained analytical solutions, the numerical solution in COMSOL was verified. There is a great difficulty in solving such problems with rotating media by the finite element method, due to required numerical precision and necessity to solve eigenvalue boundary problem for non-self-adjoint linear operator. Equation-based COMSOL solver was used as a numerical method for such problems. The solution of the initial equations by the method of finite differences was also obtained.

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