DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

The project pertains to an evaluation of energetic properties of a sound field in enclosed spaces, thus, it concerns one of the most important issues of room acoustics. It includes the development of a theoretical method and numerical tools for determining energetic parameters of the sound field in enclosed spaces, with particular emphasis on the spaces which are coupled acoustically. In theoretical modeling the wave method is applied which, unlike the methods of geometrical acoustics, takes in to account the diffraction and the interference of sound. Within the project, it is planned a creation of numerical algorithms for predicting spatial distributions of the potential energy density and the sound pressure level, but also quantities associated with the acoustic particle velocity such as the kinetic energy density and the sound intensity vector. An objective of the project is also to create the new method for determining the decay curve which uses the room impulse response and the Schroeder's backward integration technique. This method allows to calculate the decay times and to evaluate such parameters used for objective evaluation of room acoustics in a transient state as the definition, the clarity index, the centre time and the early and late lateral energy fractions. The planned research is of great importance both in theory and application. Knowledge of the energy parameters of the sound field in enclosed spaces and the ability to predict their spatial distributions allow an objective assessment of their acoustic properties both at the design stage as well as during acoustic adaptation of rooms. In addition, the novelty of the project is to include in the analysis of the acoustic field not only scalar quantities, but also vector quantities such as the active and reactive sound intensity.