

The importance of periodic ray paths in geometrical acoustics – some practically relevant examples

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ABSTRACT

Various implementations of geometrical acoustic methods exist and are also accessible in form of commercial software solutions. In practice, such methods are used to predict room acoustic parameters, identify reflection paths and generate acoustic responses. The purpose of our research is to extend the functionalities of geometrical methods by studying the importance of periodic paths in a phased ray-tracing method implementation (RTS). Our numeric case study considers two practically relevant examples in which considering the periodicity gives valuable additional information. First, based on an extreme of the generated frequency response the high/low pressure zones of the corresponding room mode are located. This information is relevant to effectively locate absorbing elements into the room. Second, we identify flutter echo paths due to reflections between non parallel walls. The required theoretical background is introduced and graphical representation of the sound field and ray paths are shown. Furthermore, some inherent limitations of the method are presented.

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