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The influence of absorption on statistical distribution of free path lengths in rooms

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The ray tracing method in sound field simulation in a room allows the calculation of the free path lengths distribution (FPL) by superimposing all rays paths generated in the analysis. In room acoustics the statistical theory of sound field defined this distribution as an indicator of room geometrical properties which are independent of absorption. Accordingly, some commercial softwares for ray tracing simulation allow user to calculate that global distribution of FPL only. This paper is concerned with the analysis of the changes in the shape of FPL distribution as a consequence of nonuniform arrangement of absorption in room. Particularly is analysed the impact of absorptive auditorium in different global forms of the halls where all other interior surfaces are acoustically hard.