

**The Investigation of Geometrical Acoustics within a 3-Dimensional
CAD Program**

by

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ABSTRACT

This thesis describes the implementation of a hybrid method Geometrical Acoustics plug-in for Rhinoceros 4.0, a NURBS-based CAD program, which can represent curved surfaces with infinitesimal precision. The plug-in performs the image-source and ray-tracing algorithms on Rhinoceros native geometry. Its results include auralizations and parameters such as Early Decay Time, Reverberation Time, Clarity and Definition. Its validity has been tested using the procedure from the third PTB Round Robin on Room Acoustics Simulation. Results from the plug-in are also compared with results from CATT-Acoustic, a proprietary Geometrical Acoustics program, with a few different room simulations. Having the capability of performing Geometrical Acoustics simulations in Rhinoceros presents the acoustical simulation community with an opportunity. The thesis concludes with some proposals for ways in which the plug-in may be used for future research.