Title: Efficient visibility calculation for light transport simulation in participating media

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Abstract: This thesis investigates the use of acceleration methods for the testing of visibility in light transport calculation algorithms with the emphasis on conservativeness and low accelerated query overhead. Several published non-directional and directional distance field methods are presented with the description of their characteristic properties. Two of these methods are then implemented and thoroughly tested in an existing rendering framework on a path tracing volumetric integrator as well as on an own implementation of a ray marching single scattering integrator. A method that further accelerates the original distance field methods by pre-caching results of some of the queries is also proposed, implemented and tested. Furthermore, several possible extensions to this method are outlined.

Keywords: computer graphics, rendering, participating media, visibility