

This thesis examines the current research and development in the field of real-time global illumination. It concentrates on techniques that are capable of simulating dynamic environments and require only limited precomputation. It contains a theoretical as well as a practical part. In the theoretical part the basics of rendering and selected global illumination methods are described, namely reflective shadow mapping, light propagation volumes and voxel cone tracing. The practical part includes implementation of selected methods, which are then tested, compared and improved. A program called R-GITE (Real-Time Global Illumination Testing Environment) was created to provide a foundation for prototyping these rendering algorithms. There are two main criteria in the testing – accuracy of the result and speed of computation. In the end we used the data from the tests to determine both the strong and the weak points of the methods and discuss usability of the methods for specific scenarios.