

Non-sequential optical field tracing

Michael Kuhn¹ Frank Wyrowski² Christian Hellmann³

Optical field tracing methods generalize ray tracing methods by considering harmonic fields instead of ray bundles. This allows the smooth combination of different modeling techniques in different subdomains of the system. Based on tearing and interconnecting ideas, the paper introduces the basic concepts of non-sequential field tracing and derives the corresponding operator equations and a solution formula for the simulation task. The evaluation requires the solution of local Maxwell problems (tearing) and the continuity of the solution across boundaries is achieved along with the convergence of the iterative procedure (interconnecting). The number of local problems to be solved is optimized by a newly introduced light path tree algorithm. Finally some examples for the selection of local Maxwell solvers and numerical results are presented.

¹ LightTrans VirtualLab UG, Kahlaische Strasse 4, 07745 Jena, Germany,
michael.kuhn@lighttrans.com

² Institute of Applied Physics, Friedrich-Schiller-University, Jena, Germany,
frank.wyrowski@uni-jena.de

³ LightTrans GmbH, Kahlaische Strasse 4, 07745 Jena, Germany,
christian.hellmann@lighttrans.com