LIGHTTRANS

Application Scenario 101.01: Parametric optimization of a lens system for focusing of a laser beam

Abstract

This application scenario shows the optimization of a lens system by the parametric optimization document of VirtualLab. The goal is to optimize a system with two spherical lenses so that a laser beam is focused in the target plane. The spherical lenses are modeled as a sequence of four conical interfaces with conical constant zero. The radii of the four conical surfaces are used as free parameters. The merit function for the optimization is the laser beam radius in the target plane. Simulation and optimization take into account diffraction, interference and aberration effects.

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Keywords:	parametric optimization, lens system, laser beam, focus
Requirements:	VirtualLab Advanced version 4.10.0 or higher – **Starter Toolbox**
Version:	1.2
Files:	Corresponding files can be found here.
Related Scenarios:	Scenario_100.01, Scenario_315.01
Related Tutorials:	Tutorial_101.01
Related Technical Notes:	TN.021

This application scenario illustrates the optimization of a lens system for focusing a laser beam. Detailed information on the modeling task can be found in the file "`Scenario_101.01_Parametric_optimization_of_a_focusing_lens_Task.pdf`". The light path diagram containing the lens system before the optimization can be found in the file "`Scenario_101.01_Parametric_optimization_of_a_focusing_lens_1.lpd`". The radii of all spherical surfaces are set to initial values of ±25 mm. The file "`Scenario_101.01_Parametric_optimization_of_a_focusing_lens_2.lpd`" contains the parametric optimization document after the end of optimization. To restart the optimization with the initial values change to the *Constraint Specification* page, open the *Optimization Tools* and select *Reset Start to Initial Values*. After that change to the *Optimization Results* page and click on *Start*. The light path diagram containing the optimized lens system can be found in the file "`Scenario_101.01_Parametric_optimization_of_a_focusing_lens_3.lpd`".

Technical Support

If you have any questions, remarks or problems concerning this application scenario, or in using VirtualLab in general, please do not hesitate to contact us by E-Mail support@lighttrans.com.

Please use the update service to install the current version of VirtualLab. Alternatively you can use the latest **Trial Version** of VirtualLab which is available at our download site. If you have been registered already for an older trial version, just contact us by E-Mail.

To ensure that this application scenario gives the same results as described, set the global settings to the default values. In VirtualLab this can be done in the Extras > Global Options dialog with the *Reset All* button.