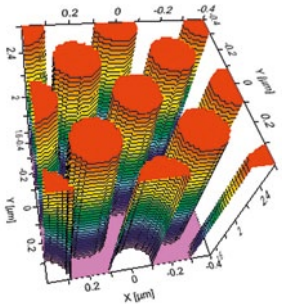
VirtualLab™5

Grating Toolbox

Rigorous analysis of 2D and 3D gratings

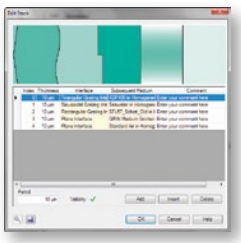


Surface profile of a 3D sub-wavelength grating used as antireflection structure.

The VirtualLab™ Grating Toolbox allows the rigorous electromagnetic analysis of 2D gratings, 3D gratings, and photonic crystals with features from nanometer to millimeter scale. Diffraction efficiency, near field, polarization, reflectance, transmittance, absorption and the field inside gratings can be calculated. Various customization features allow the analysis and optimization of gratings with user defined structures. These include the import of measured height profiles, as well as programmable height profiles and media which allow to enter a formula describing a height profile or a refractive index distribution.

In addition grating structures can be constructed by building stacks of surfaces and homogeneous as well as inhomogeneous media. The powerful optimization feature of VirtualLab™ enables the local and global parametric optimization of gratings. The investigation of tolerances is possible by the parameter run.

Your Benefit



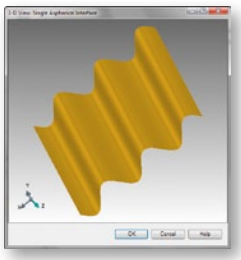
Customized 2D grating defined as a stack of surfaces and index modulations.

- Electromagnetic and approximated analysis of surface and volume gratings as for example diffractive beam splitters, polarizers, antireflection structures, diffractive optical elements, photovoltaic systems, holographic gratings, and spectroscopic gratings.
- 2D and 3D gratings with feature sizes from nanometer to millimeter scale.
- Calculation of diffraction orders, efficiency, near field, polarization, reflectance, transmittance, absorption and field inside grating.
- Investigation of tolerances, parameter variations and parametric optimization.

LightTrans

Grating Toolbox

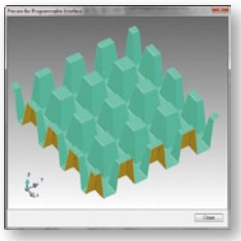
Selected Features



Surface profile of
2D sinusoidal grating.

Analysis of 2D and 3D gratings

The Grating Toolbox is using the Fourier Modal Method for a rigorous analysis of 2D and 3D gratings. Predefined gratings as for example sinusoidal, triangular, sawtooth, holographic gratings as well as customized grating structures can be modeled. Typical applications are the analysis of polarizers, spectroscopic gratings, diffractive beam splitters, photonic crystals, gratings for fiber coupling, sub-wavelength gratings, moth-eye structures, artificial media and zeroth-order gratings.



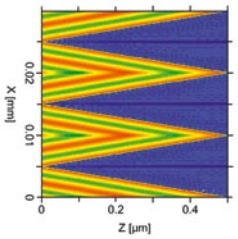
Pyramid type 3D surface
grating.

Customized 2D and 3D gratings

The Grating Toolbox supports the import of measured 1D and 2D height profiles. Furthermore, programmable interfaces and programmable media allow to enter a formula describing a height profile or the distribution of the refractive index. The stack concept enables the description of gratings as a sequence of surfaces as well as homogeneous and inhomogeneous media.

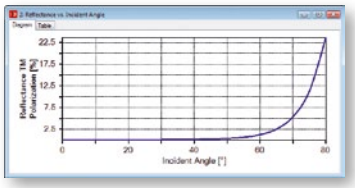
Evaluation of field distributions

Depending on grating applications, various evaluations of simulation results are required. This includes for example the calculation of diffraction orders, efficiencies, near field, polarization, reflectance, transmittance, absorption and field inside grating.



Tolerance analysis and optimization of gratings

The powerful parameter run of VirtualLab™ enables the variation of a single parameter, the multidimensional scanning parameter variation and a random (Monte-Carlo) parameter variation in order to investigate the effects of tolerances. VirtualLab™ enables the parametric optimization of predefined and customized grating structures.



Reflectance of a 3D sub-wavelength
pillar type medium.

More information concerning this toolbox including a list of all available features is shown on our website **www. lighttrans.com**

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