

Application Scenario 087.01: Simulation of gratings with rough surface

Abstract

The simulation of a sinusoidal grating with a rough random surface will be demonstrated. The simulation is done using the programmable interface in a stack on the General Grating 2D Component of VirtualLab.

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Keywords: Gratings, rough surfaces, programmable grating
Requirements: VirtualLab version 5.2.1 or higher – **Grating Toolbox**
Scenario Version: 4.0
Sample Files: Corresponding files can be found [here](#).
Related Scenarios: [90.01](#), [246.01](#)

Introduction

This application scenario provides a snippet for a one-dimensional rough interface. If one uses this snippet in a programmable interface and combines it with an arbitrary interface, one can superimpose roughness to that interface.

This application scenario demonstrates how the diffraction pattern of a rough surface differs from that of an ideal smooth surface. Sample results can be found in the included separate slides.

Explanation of the used Snippet

The snippet is included as Scenario_087.01_Grating_with_Rough_Surface_01.txt. It has the following global parameters:

VARIABLE	DESCRIPTION
<i>RandomHeightValuesInitialized</i>	This variable ensures that the generation of the random heights is only done once. It must not be changed by the user.
<i>SmallestFeatureSize</i>	If a random height value has been generated for a certain position, the next random height is generated at a position the <i>SmallestFeatureSize</i> away. Between these sampling points it is interpolated. See also Fig. 1 .
<i>TotalHeightModulation</i>	Defines the maximum possible height ($= +0.5 \cdot \text{TotalHeightModulation}$) and the minimum possible height ($= -0.5 \cdot \text{TotalHeightModulation}$). See also Fig. 1 .
<i>Seed</i>	The seed of the random number generator. Only the integer part of the given value is taken into account. If the seed is -1 then always a different random height profile is generated. For other values of the seed one always obtains the same profile.

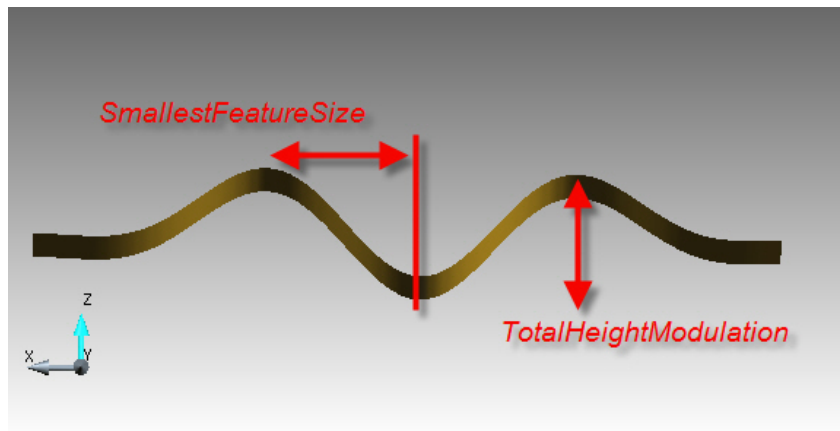


Figure 1. A sample profile explaining the structure parameters of the snippet

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. 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.