

UseCase.0029 (1.0)

Parameter Overview

Keywords: Parameter Overview, grating equation, find, set, configure, quick, fast, system, comparison, check

Introduction

 This use case introduces the Parameter Overview dialog which allows you to set all numerical parameters within a Light Path Diagram at once.



Rationale for the Parameter Overview

The VirtualLab user interface was designed with the following premises:

- Modular: For example you can edit the interfaces of a Double Interface Component and of a stack with the very same dialogs.
- Explanatory: Additional information and images explain complex issues.

Effect on Field Outside of Definition Area	
Field Passes Plane Interface	
Field is Absorbed	
Position of Surrounding Absorbing Plane	Def. Area
Specification Mode	
Boundary Minimum 💌	
z-Position 0 m	0 z-Position

• Structured: Tab pages and boxes group related controls.

Rationale for the Parameter Overview

- However, this leads to many user interactions required to change a single parameter.
- To change the period of a sawtooth grating for example, you need to do the following.

Rationale for the Parameter Overview

	Edit General Grating	3 2D		
Sawtooth Grating		Boundaries Base Block		
	Geometry / Channels	Base Block Medium	Edit Stack	
X:0m Y:0m		Fused Silica in Homogeneous Medium		Edit Sawtooth Grating Interface
Z: 0 m · · · · · · · · · · · · · · · · · ·		Cad Zedit	×	Structure Height Discontinuities Scaling of Bementary Interface Periodization
1 double	Position / Orientation	Thickness 10 m	Bloc	Inclination Height Increases with x Height Decreases with x
		Stacke	se	Common Grating Values
click		Use Stack on First Interface Use Stack	Ba	Extension
	Structure / Function	Catalog Entry Catalog Entry		Grating Period 2 µm Modulation Depth 1 µm
		Sawtooth Grating Stack	Index Distance Position Interface Subseque	Position
		Load Zelit Q View Coad	▶ 1 0 m 0 m Sawtooth Grating Int	Lateral Shift 0 m Rotation Angle 0*
	Propagation	No rotation about z-Axis		Inner Definition Area
				- Size and Shape
				Shape Rectangular Elliptic
				Size 2 µm x +inf m
			۲ III	Effect on Field Outside of Definition Area
		Stack Base Block	Validity: 🗸 🛛 🗛 🖉	Field Passes Plane Interface
			Period	Field is Absorbed
		Tools 🖓 🗸	Stack Period is Dependent from the Period of Interface	Position of Surrounding Interface Plane
	Preview Waveleng		Stack Period 2 µm	Specification Mode
				Boundary Minimum 👻
		7		z-Position 0 m
	2. CIIC	K		0 z-Position
			3. Click	Image: Second state Validity: ✓ OK Cancel Help
				4 change value
				n enange value
			/	
	F	a a stimula a static		a aliaka ta OK huttana
	b .	confirming and closing	g all edit dialogs by three	e clicks to UK duttons.

Usage Example

- For a sawtooth grating system, both the wavelength and the period shall be doubled using Light Path > Parameter Overview.
- Original result:



Parameter Overview Dialog

- The Parameter Overview dialog mainly consists of a table containing all numerical parameters of a Light Path Diagram.
- You can set a new value for each parameter directly in the table.

Hierarchy in the Dialog

- The parameters are presented in a hierarchy. The top level lists the distinct Light Path Elements, the second level lists "Categories" e.g. the interfaces, media, and stacks in each Light Path Element, and the third level lists the actual Parameters.
- The hierarchy levels can be collapsed or expanded by clicking on the +/- symbols or the 1, 2, * in the first column.

	12*	Light Path Element	Category	Parameter	Value	^
ľ	Ģ			Spherical Angle Theta	0°	1
			Basal Positioning	Spherical Angle Phi	0°	
	-			Angle Zeta	0°	
				Thickness of Base Block	10 mm	
			Base Block Medium (Material of Homogeneous Medium Constant Abso	0	
				Sawtooth Grating Interface #1 (Sawtooth Grating I	20 mm	
				Sawtooth Grating Interface #1 (Sawtooth Grating I	20 mm	
				Sawtooth Grating Interface #1 (Sawtooth Grating I	1	
		Sawtooth Grating #1	Stack #1 (Sawtooth	Sawtooth Grating Interface #1 (Sawtooth Grating I	2 µm	
			Grating)	Sawtooth Grating Interface #1 (Sawtooth Grating I	1 μm	
L	<u></u>				-2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Hierarchy in the Dialog

- **1** : The table is completely collapsed.
- 2: The Light Path Elements are expanded, all Categories are collapsed.
- *: Everything is expanded.

12 *	Light Path Element	Category	Parameter	Value
÷	Ideal Plane Wave #0			
Đ	Sawtooth Grating #1			
Đ	Virtual Screen #600			
÷	Virtual Screen #601			

12	Light Path Element	Category	Parameter	Valu	*
			Spherical Angle Theta	0°	
		Basal Positioning	Spherical Angle Phi	0°	
			Angle Zeta	0°	
			Thickness of Base Block	10 m	
	Sawtooth Grating #1	Base Block Medium (Fused Silica	Material of Homogeneous Medium C	0	
··· 🛨		Stack #1 (Sawtooth Grating)			
			Accuracy Factor for FMM (Layers)	1	
·			Accuracy Factor for FMM (Transition	1	_
			Number of Evanescent Orders	50	

12*	Light Path Element	Category	Parameter	Valı 🔺
e.			Spherical Angle Theta	0°
-		Basal Positioning	Spherical Angle Phi	0°
			Angle Zeta	0°
	Sawtooth Grating #1		Thickness of Base Block	10 m
		Base Block Medium (Material of Homogeneous Medium Constant Abs	0
		Stack #1 (Sawtooth Grating)	Sawtooth Grating Interface #1 (Sawtooth Grating I	20 m _
			Sawtooth Grating Interface #1 (Sawtooth Grating I	20 m ⁼
			Sawtooth Grating Interface #1 (Sawtooth Grating I	1
			Sawtooth Grating Interface #1 (Sawtooth Grating I	4 µr
			Sawtooth Grating Interface #1 (Sawtooth Grating I	1 µr
			Sawtooth Grating Interface #1 (Sawtooth Grating I	0 m –
			Sawtooth Grating Interface #1 (Sawtooth Grating I	0°
			Homogeneous Medium #1 (Standard Air in Homog	0

Double the Wavelength



Filter for Period



Double the Period

	Change to			ige to
			"4 μ	um"
Se	et Parameters			
	Filter Parameter Table by	y Name Period		
	Light Path Element	Category	Parameter	Value
	Sawtooth Grating #1	Stack #1 (Sawtooth	Sawtooth Grating Interface #1 (Sawtooth Grating I	2 μm
Ŀ			· · · · · · · · · · · · · · · · · · ·	
L				
L				
L				
L				
L				
	Show Minimum and M	Maximum Allowed Values	OK Can	el Help

Result Comparison

Result original simulation



Result with doubled wavelength and period



The diffraction angles remain unchanged, as expected from the grating equation. But of course the efficiencies differ.



- The Parameter Overview document enables the user to check and change any and arbitrary many numerical parameters of an optical system very fast and efficiently.
- By entering search keywords for parameters that are of interest, VirtualLab filters all relevant parameters.
- The Parameter Overview document can be used for an easy comparison of settings of different Light Path Diagram documents.