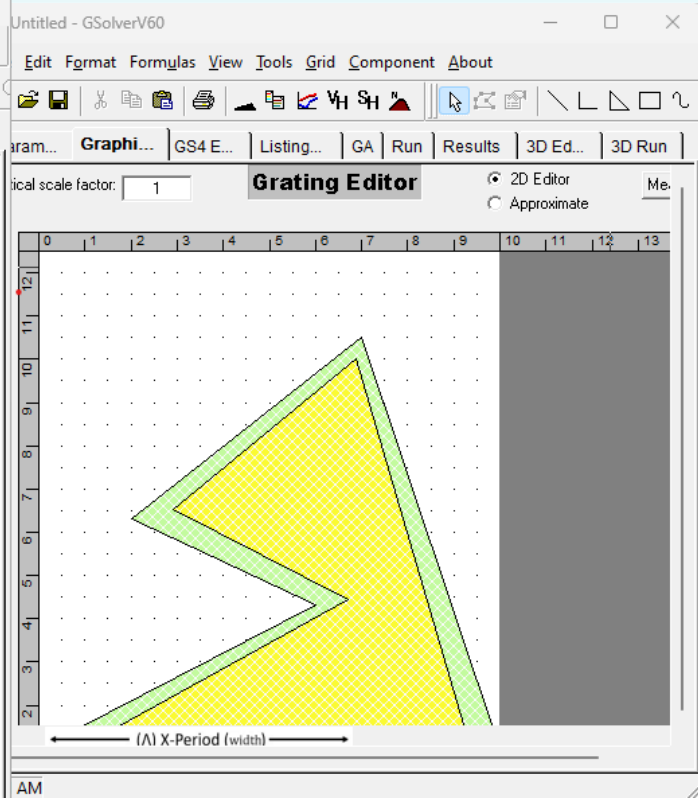
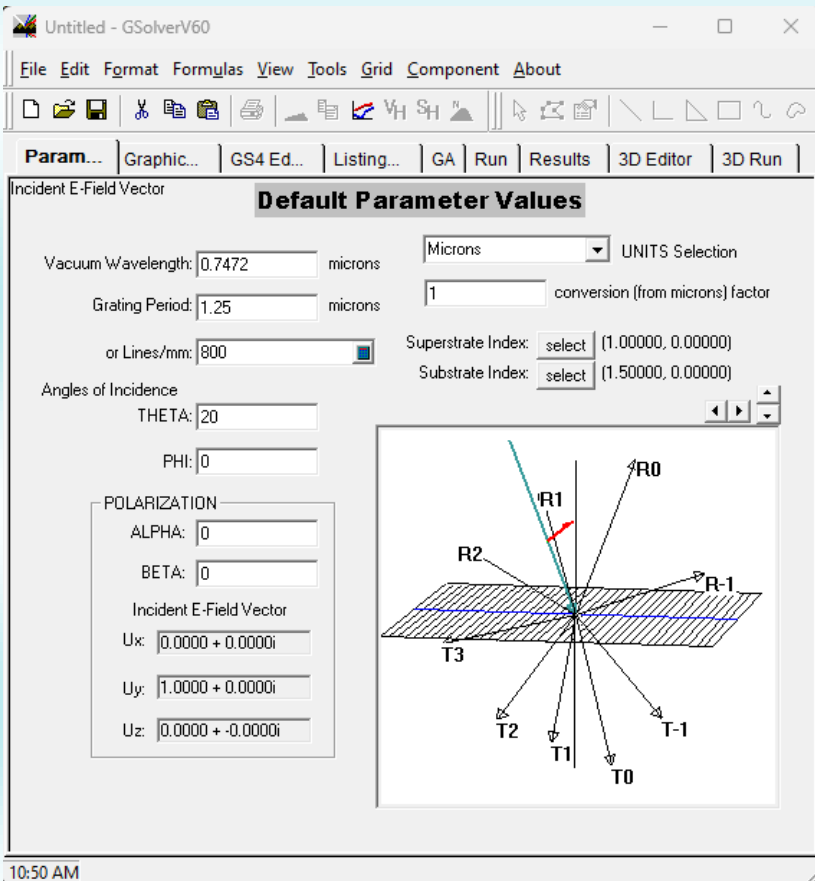
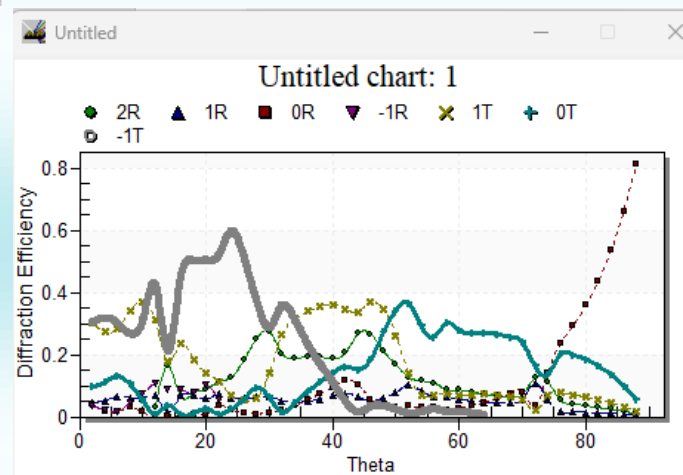


GSOLVER© V6.0 Diffraction Grating Analysis Program



Principle Features

- Full 3D vector solution (with choice of solution method)
- Arbitrary polarization including TE, TM, Elliptical
- Conical mounts
- Arbitrary number of index changes per level
- Arbitrary number of grating levels
- Calculation of complex vector E-fields
- Powerful graphical grating structure editor
- Material catalogs and editor
- Optimized partitioned matrix calculations
- Multiple graphical, data spreadsheet, and text windows
- Genetic algorithm based automatic design
- Arbitrary algebraic constraints
- Diffraction angles calculation tool
- Diffracted order phase calculation



Grating Solver Development
Company

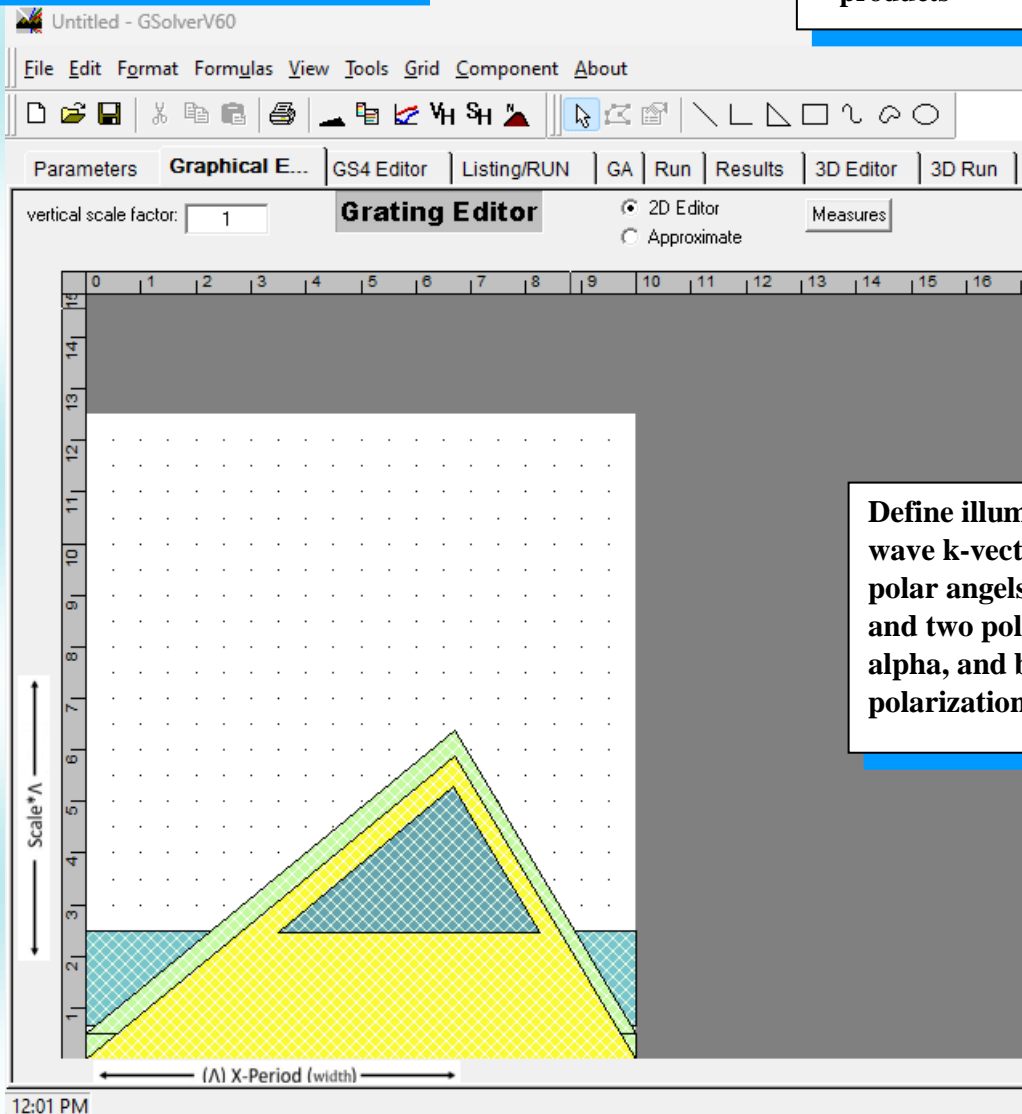
<https://www.gsolver.com>

GSOLVER© V6.0 Graphical Grating Editor

Draw arbitrary profiles

- Tools for classical profiles
- Draw structure on unit cell
- Pallet of graphical primitives
- Assign material properties

- Automatic piecewise constant approximation
- Drag and Drop graphical primitives
- OLE container for Microsoft Office products



Define illumination, plane wave k-vector with two polar angles, theta, and phi, and two polarization angles, alpha, and beta (for general polarization selection)

Refractive Index Catalog

- Nobel Metals (Drude Model)
- Glass Catalogs (Schott, Corning, Hoya, O'Hara)
- IR Materials (Sellmeier, Herzberger)
- 9th order polynomial (real and image)
- Table look-up
- Graphical coefficient editor

- Transverse, and crossed grating structures are fully supported
- General polarization, and angle of incidence including conical mounts

GSOLVER© V6.0 Flexible Execution Control

The screenshot shows the 'Listing/RUN' tab of the GSolverV6.0 software. The spreadsheet contains the following parameters and formulas:

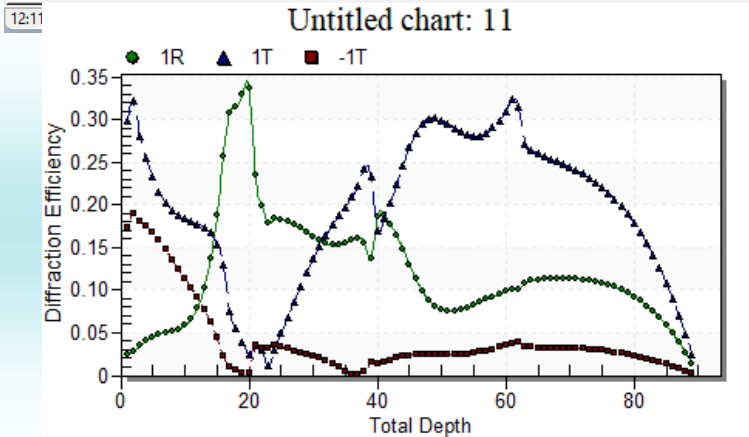
Row	Parameter	Value/Formula	Other
2	'Theta:	=D5	
3	'Phi:	0	
4	'Alpha:	0	
5	'Beta:	0	
6	'wavelength:	0.7472	
7	'Period:	=1+SIN(D5/100)	Update, Decrement, Increment
8	'Superstrate:	'One.5	
9	'Substrate:	'One.5	RUN, Populate, Copy/Update
10	'Orders:	5	Update Parms
11	'LAYER	'1	0 %
12	'Thickness	0.05	=B12
13	'Block:	'1	Abort, Write Fields
14	'Width:	0.05	=B14
15	'Material:	'AgCl	'Cell List
16	'Block:	'2	
17	'Width:	0.95	=B14+B17
18	'Material:	'One.5	
19	'LAYER	'2	
20	'Thickness	0.05	=B20+C12
21	'Block:	'1	
22	'Width:	0.05	=B22
23	'Material:	'AGAINP10	
24	'Block:	'2	
25	'Width:	0.05	=B22+B25
26	'Material:	'AgCl	
27	'Block:	'3	
28	'Width:	0.85	=B22+B25+B28
29	'Material:	'One.5	
30	'Block:	'4	
31	'Width:	0.05	=B22+B25+B28

General Algebraic Parameter Entry

- Enter arbitrary algebraic expression with constraints for parameter variation

The screenshot shows the 'Results View' of the GSolverV6.0 software. It displays a table of results for various parameters and orders.

	5T	4T	3T	2T	1T	0T	-1T	-
-0	-0	-0	-0	0.14386	0.29851	0.050742	0.17346	0.067
-0	-0	-0	-0	0.1518	0.32201	0.051741	0.18913	0.001
-0	-0	-0	-0	0.16485	0.28086	0.039136	0.18051	-0
-0	-0	-0	-0	0.1746	0.25502	0.034127	0.17545	-0
-0	-0	-0	-0	0.18567	0.23305	0.030552	0.16846	-0
-0	-0	-0	-0	0.1988	0.21536	0.028356	0.15902	-0
-0	-0	-0	-0	0.21267	0.20233	0.027393	0.14784	-0
-0	-0	-0	-0	0.22501	0.19344	0.027191	0.13613	-0
-0	-0	-0	-0	0.23402	0.18759	0.027166	0.12471	-0
-0	-0	-0	-0	0.23879	0.18363	0.026842	0.11373	-0
-0	-0	-0	-0	0.23916	0.18086	0.025911	0.10281	-0
-0	-0	-0	-0	0.23531	0.17784	0.024187	0.091194	-0
-0	-0	-0	-0	0.22761	0.17398	0.021605	0.077955	-0
-0	-0	-0	-0	0.21674	0.16709	0.018329	0.062225	-0
-0	-0	-0	-0	0.20407	0.15403	0.015094	0.043613	-0
-0	-0	-0	-0	0.19175	0.12988	0.013875	0.022545	-0
-0	-0	-0	-0	0.19184	0.075267	0.015595	0.006434	-0
-0	-0	-0	-0	0.19333	0.055128	0.018431	0.0067912	-0
-0	-0	-0	-0	0.18937	0.039042	0.029584	0.0024101	-0
-0	-0	-0	-0	0.16951	0.025287	0.067646	0.0031395	-0
0.60452	-0	-0	0.038051	0.13335	0.035227	0.15427	0.034591	-0
0.57551	-0	-0	0.066654	0.13698	0.029922	0.15929	0.031638	-0
0.50146	-0	-0	0.082287	0.12156	0.01163	0.25162	0.031445	-0
0.51042	-0	-0	0.070503	0.087956	0.029873	0.26628	0.034964	-0
0.52104	-0	-0	0.064396	0.079429	0.049951	0.25157	0.033619	-0
0.52181	-0	-0	0.060869	0.074635	0.068841	0.24284	0.031202	-0
0.51957	-0	-0	0.057597	0.07185	0.086804	0.23558	0.028803	-0
0.51837	-0	-0	0.053558	0.070277	0.10403	0.22706	0.026702	-0
0.52067	-0	-0	0.048426	0.0693	0.12082	0.21601	0.024774	-0
0.52765	-0	-0	0.042258	0.068376	0.13674	0.20224	0.022742	-0



- GSOLVER V6.6 features optimized algorithms that solve the full vector Maxwell equations in the grating region. Arbitrarily complex grating structures made of an arbitrary number of materials specified by piecewise constant model. The algorithm is based on a 'Rigorous Coupled Wave' method using Stack matrix methods to solve for the interlayer boundary conditions. Specializations are used to speed convergence for arbitrary polarization. Optimizations for TE and TM polarization modes are also included.

GSOLVER© V6.0 Genetic Algorithm – Differential Evolution

Untitled - GSolverV60

File Edit Format Formulas View Tools Grid Component About

Parameters Graphical Editor GS4 Editor Listing/RUN GA Run

	A	B	C	D	E
1	GA Grating Definition Listing				
2	Theta:	30			
3	Phi:	0			
4	Alpha:	0			
5	Beta:	0		Min Value	Max Value
6	wavelength:	0.7472		-5	5
7	Period:	1.25		0	80
8	Superstrate:	Ones			
9	Substrate:	One.5		Weight: 0.7000	
10	Orders:	5		CrossOver: 0.3	
11	LAYER 1			Population: 25	
12	Thickness	0.05	0.05	MaxIterations:	
13	Block:	1		Method: Rand1	
14	Width:	0.05	0.05		
15	Material:	AgCl		RUN GA	Populate
16	Block:	2			Copy/Update
17	Width:	0.95	1	Abort	Update Parm
18	Material:	One.5			Options
19	LAYER 2				
20	Thickness	0.05	0.1		
21	Block:	1			
22	Width:	0.05	0.05		
23	Material:	Sapphire			
24	Block:	2			
25	Width:	0.05	0.1		
26	Material:	AgCl			
27	Block:	3			
28	Width:	0.85	0.95		
29	Material:	One.5			
30	Block:	4			
31	Width:	0.05	1		

Genetic Algorithm Optimization

- Enter arbitrary algebraic constraint expressions
- Arbitrary number of control parameters
- Multiple diffraction efficiency goals
- Multiple evolution strategies
- Full Differential Evolution option control

Genetic Algorithm Settings/Differential Evolution

Population: nominally 10x total number of parameters

Weight: nominally = 0.8 (0 < F <= 1), larger values => faster convergence

Cross-over: nominally = 0.9 (0 <= CR <= 1.)

Max Iterations: Stopping criterion

Number of Real Parameters:

Select differential solution mode:

Goal settings for selected orders:

Order	Goal	Weight
Enter DE Goals: 0 R	0	1

Add
Clear
Clear All

Integrated Merit Function

	Start	Stop	#Samples
Wavelength <input type="checkbox"/>	1	1.5	10
Theta <input type="checkbox"/>	0	45	10
Phi <input type="checkbox"/>	0	180	10
Alpha <input type="checkbox"/>	0	90	8
Beta <input type="checkbox"/>	-45	45	8

Checked values extend merit function over selected range.

$$M = \sum \mu(\text{parameter})$$

The merit function is summed over the parameter range overriding grid formulas.

OK
Cancel