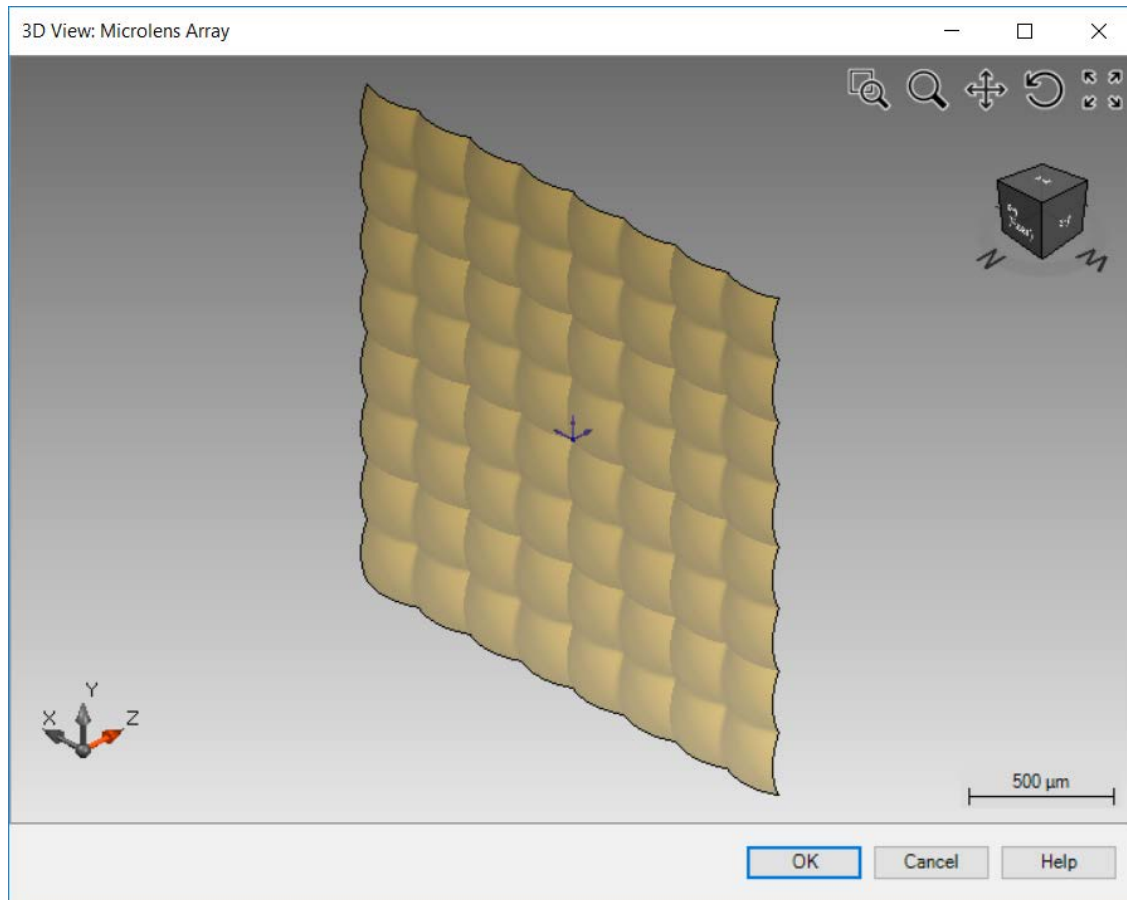


Programming a Micro-Lens Array

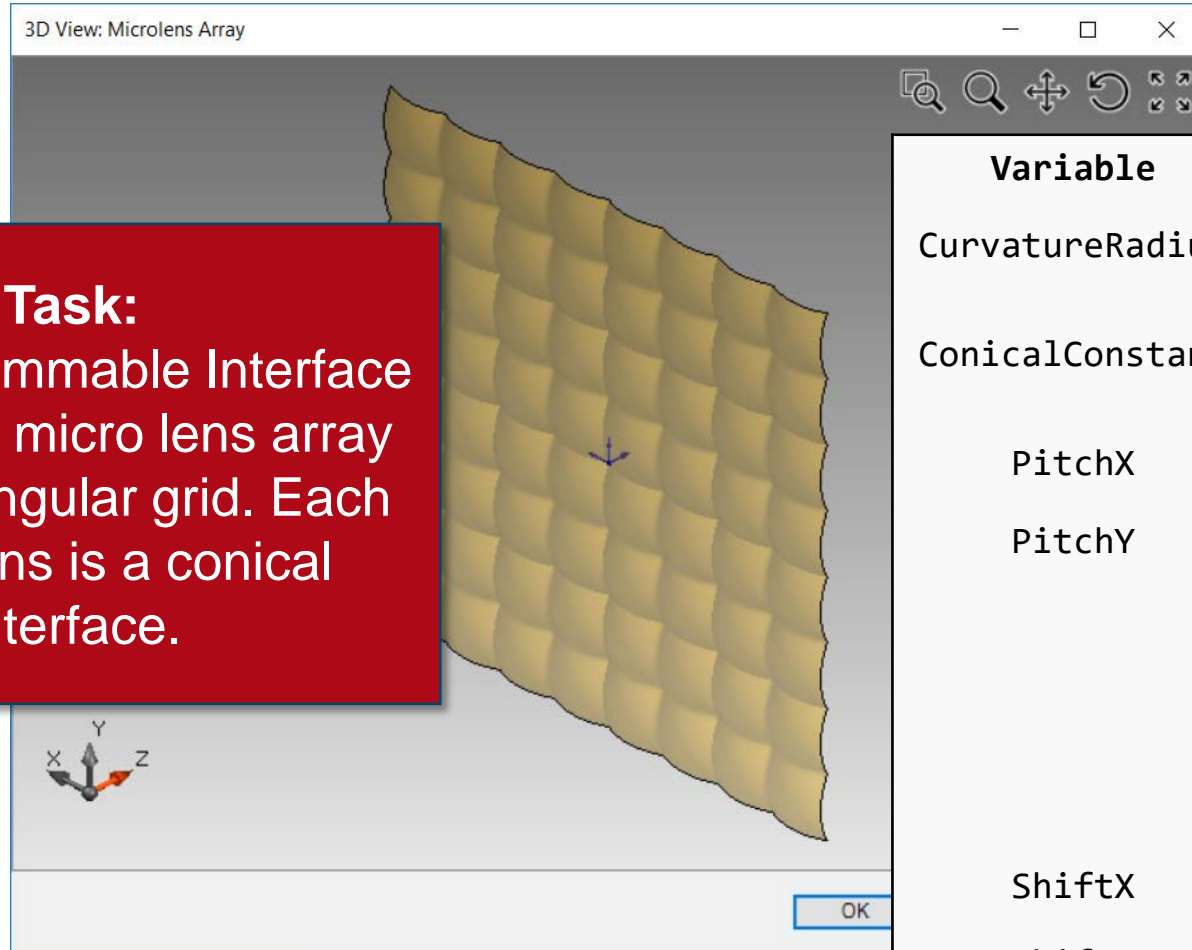
Abstract



In this document, an example is shown on how to generate an array of micro-lenses by using the Programmable Interface in VirtualLab Fusion. In this example, the micro-lenses are distributed on a rectangular grid, and each lens is constructed by using a conical surface, with the radius of curvature and the conical constant as variables that can be defined by the user.

Task Description

Task:
Use Programmable Interface to define a micro lens array on a rectangular grid. Each micro lens is a conical interface.



Variable	Description
CurvatureRadius	The radius of curvature of a single micro lens.
ConicalConstant	The conical constant of a single micro lens.
PitchX	The distance between the individual micro lenses in x- and y-direction, respectively. It is possible to make the pitch larger than the actual size of the micro lens. If you set the pitch for one direction to a very small value (let's say 1 pm) you obtain an array of cylindrical lenses.
PitchY	
ShiftX	The whole micro lens array can be shifted away from the optical axis.
ShiftY	

Programming a Micro Lens Array

Source Code Editor

Source Code Global Parameters Snippet Help Advanced Settings

```
1 double height = 0.0;
2
3 //apply shift
4 x += ShiftX;
5 y += ShiftY;
6
7 x = x % PitchX;
8 if (x > PitchX / 2.0) { x -= PitchX; }
9 if (x < -PitchX / 2.0) { x += PitchX; }
10
11 y = y % PitchY;
12 if (y > PitchY / 2.0) { y -= PitchY; }
13 if (y < -PitchY / 2.0) { y += PitchY; }
14
15 double curvature = 1 / CurvatureRadius;
16
17 height = curvature * (x * x + y * y);
18 height /= 1.0 + Math.Sqrt(1.0 - (1.0 + ConicalConstant) * curvature * height);
19
20 // set the correct height outside of the lens
21 if (Double.IsNaN(height)) {
22     height = CurvatureRadius;
23 }
24
25 return height;
```

Check Consistency Validity: 2

OK Cancel Help

Global Parameters (User Defined)

Variable	Value	Allowed range
double CurvatureRadius	0.000305 m	0 mm - 1 m
double ConicalConstant	0	-1000 - 1000
double PitchX	0.00025 m	0 mm - 1 m
double PitchY	0.00025 m	0 mm - 1 m
double ShiftX	0.000125 m	-1 m - 1 m
double ShiftY	0.000125 m	-1 m - 1 m

Document Information

title	Programming a Micro-Lens Array
document code	CZT.0037
version	1.0
toolbox(es)	Starter Toolbox
VL version used for simulations	7.4.0.49
category	Feature Use Case
further reading	<ul style="list-style-type: none">- How to Work with the Programmable Interface & Example (Spherical Surface)- Programming a Sinusoidal Surface- Programming an Anamorphic Surface