

Feature.0024

Usage of Field Curvature Analyzer

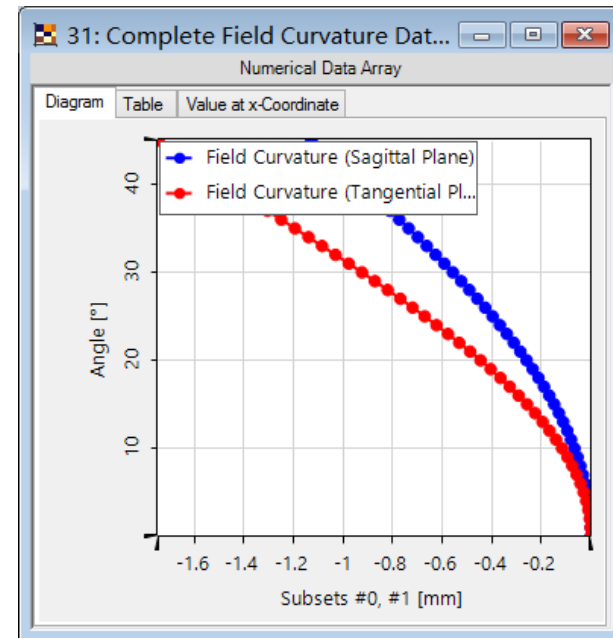
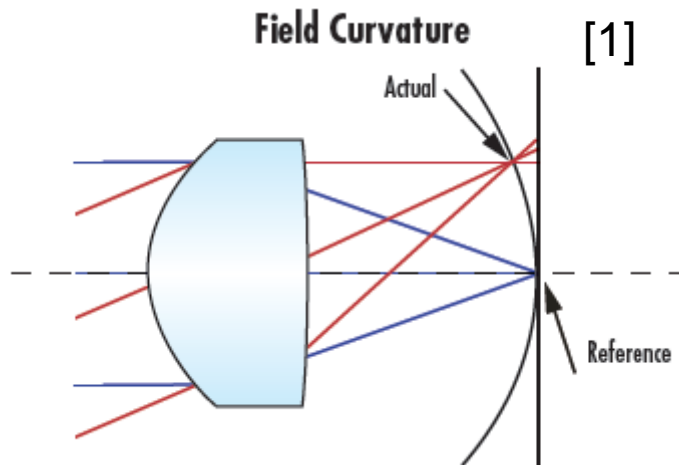
Precise analysis of field curvature of a lens component. The plotting of field curvature versus angles can be obtained easily.

About This Use Case

- The following toolbox is required:
 - Starter toolbox
- This use case is created by using VirtualLab Fusion (Build 7.0.0.35).
- Get your free Trial Version [here!](#)

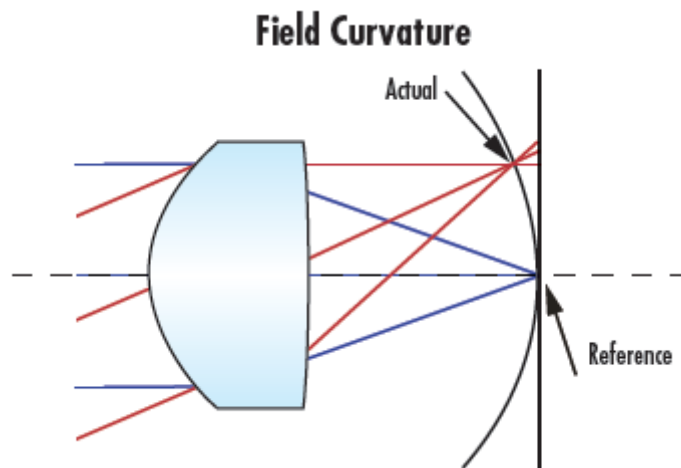
This Use Case Shows ...

- definition of field curvature
- setting of the field curvature analyzer in VirtualLab
- numerical example



What is Field Curvature?

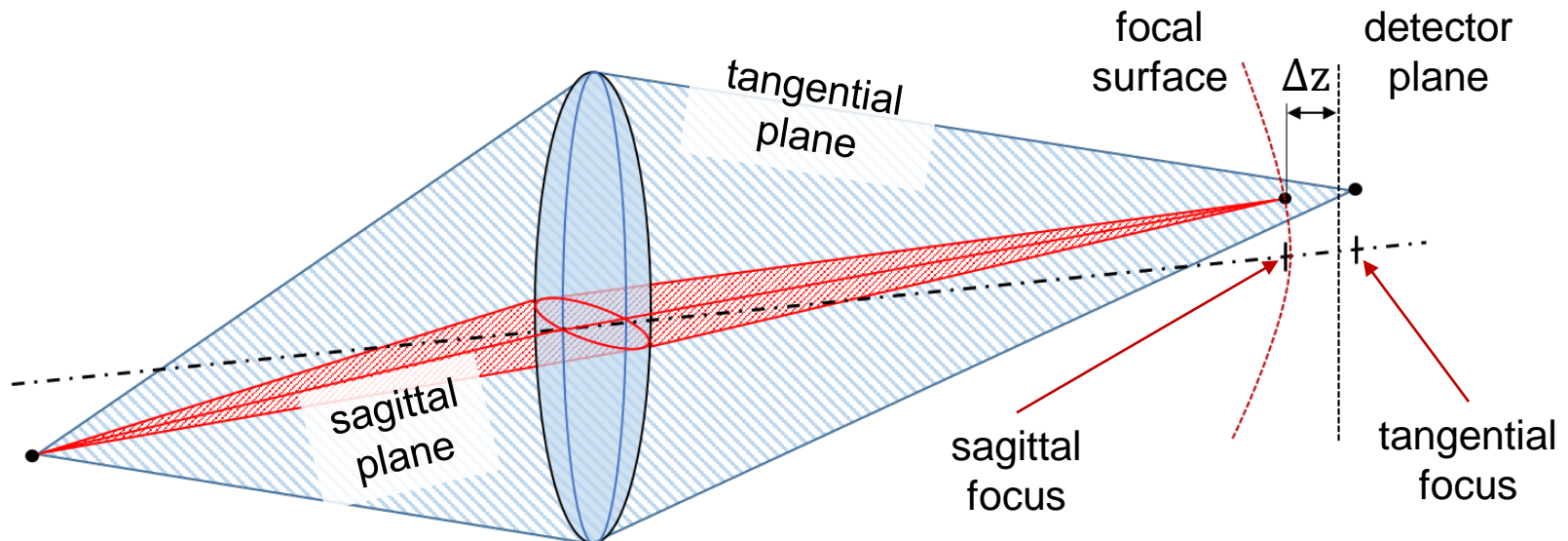
- Field Curvature, also known as “curvature of field” is a common optical problem that causes a flat object to appear sharp in a certain part(s) of the frame, instead of being uniformly sharp across the frame. This happens due to the curved nature of optical elements, which project the image in a curved manner, rather than flat.



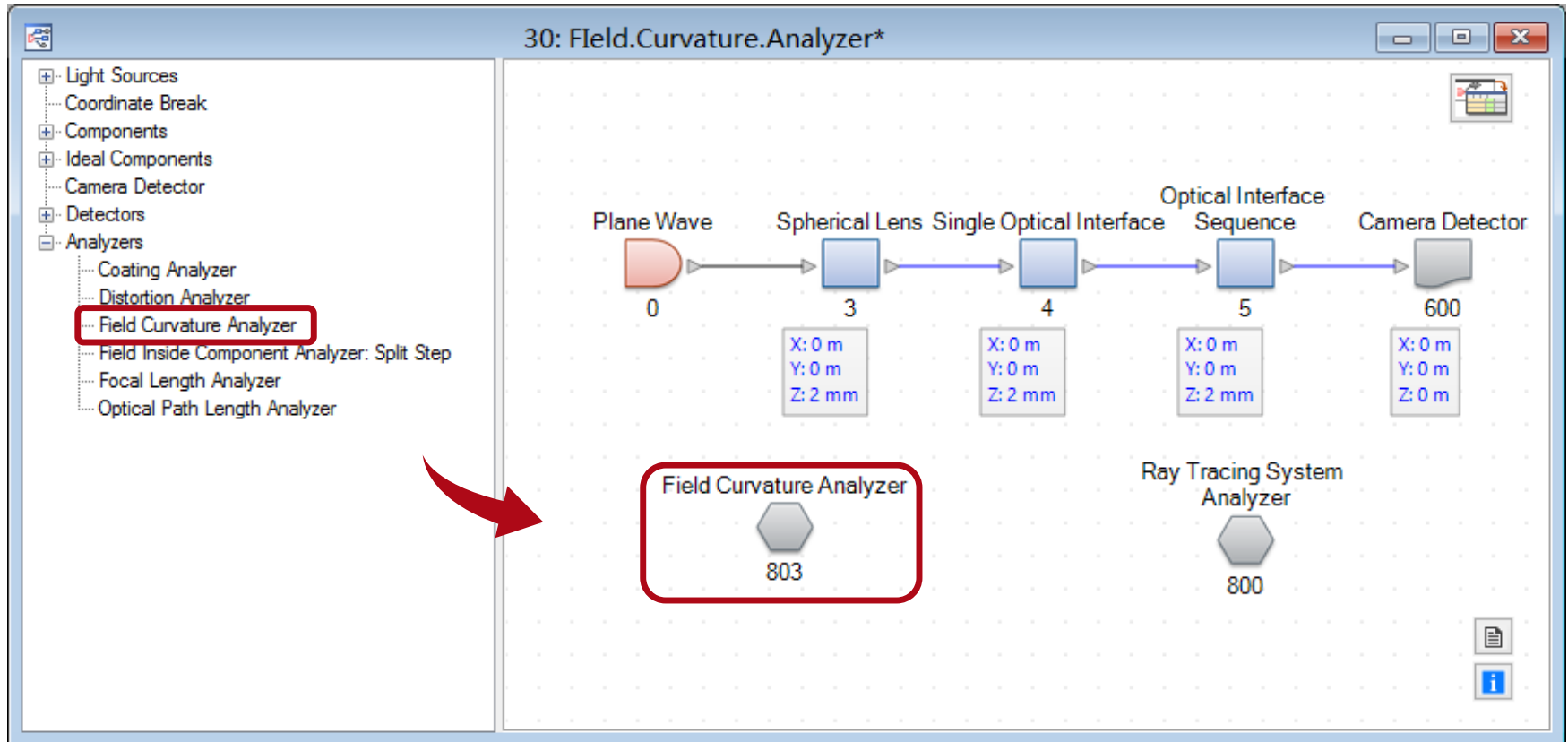
Field curvature is the aberration that describes the magnitude to which the image plane wants to be naturally curved.

Determination of Field Curvature

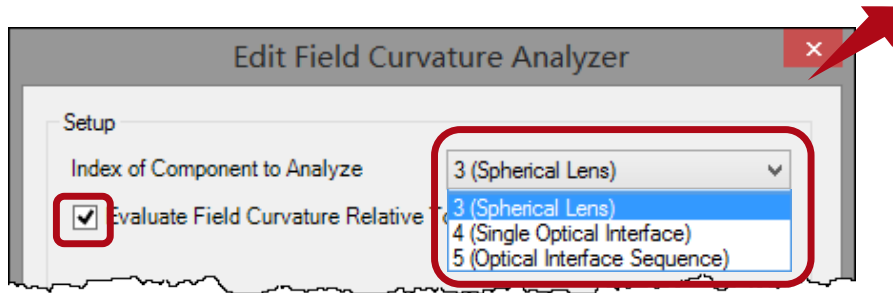
- The field curvature is measured along the z-axis (Δz is the distance between focus of the ray bundle and detector plane).
- The position of focus is determined via the RMS spot radius in two separated planes: the tangential and the sagittal plane (see figure below).
- It is a criteria for defocusing of off-axis beams regarding a flat image plane. The perfect image describes a curved surface instead. This fact has to be taken into account for example in laser scanning applications.



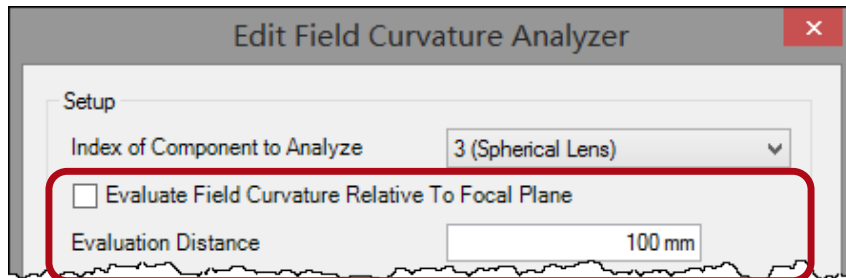
Field Curvature Analyzer in VirtualLab



Setting of the Analyzer



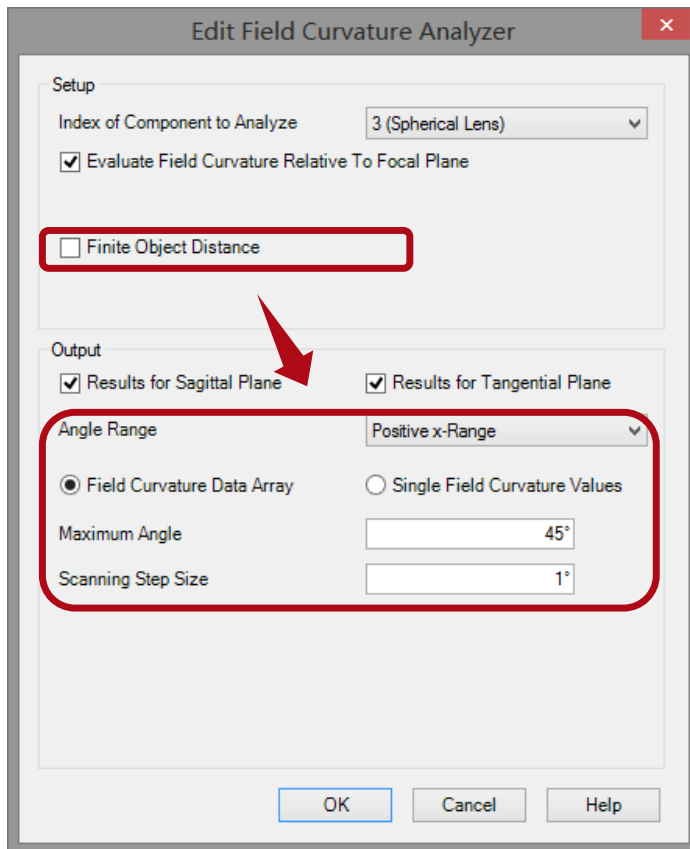
or



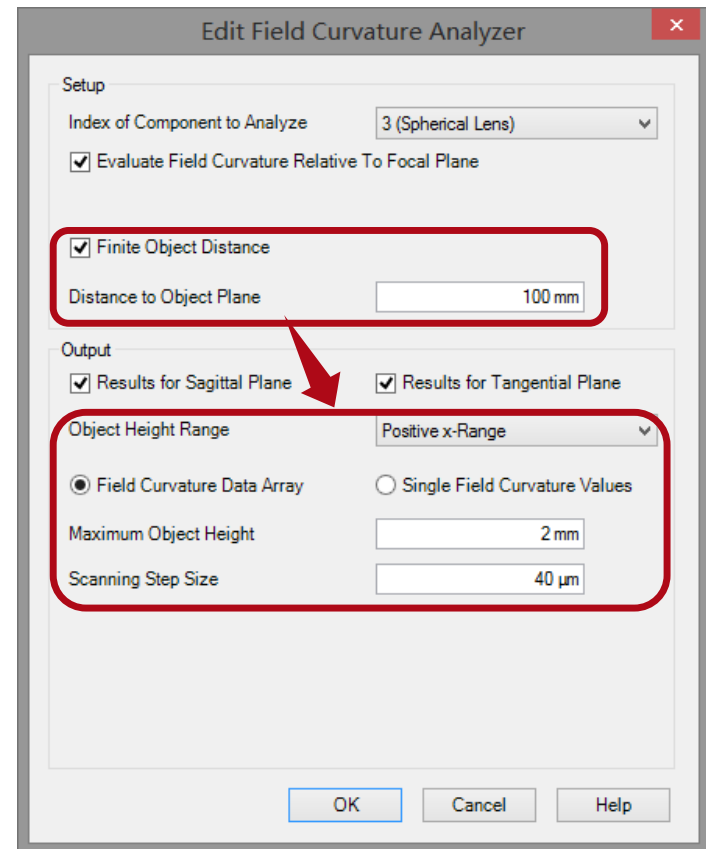
- Select a lens component to be analyzed. The analysis is independent of the system.
- Check the option to set the detector plane at effective focal length
- Determine the *Evaluation Distance* according to user's requirement

Setting of the Analyzer

Field Curvature vs. Angle



Field Curvature vs. Object Height



Field Curvature of Spherical Lens

30: Field.Curvature.Analyzer*

Light Sources
Coordinate Break
Components
Ideal Components
Camera Detector
Detectors
Analyzers

Plane Wave 0 → Spherical Lens 3 → Single Optical Interface 4 → Optical Interface Sequence 5 → Camera Detector 600

Field Curvature Analyzer 803
Ray Tracing System Analyzer 800

29: Field.Curvature.Analyzer*

Path Detectors Analyzers Logging

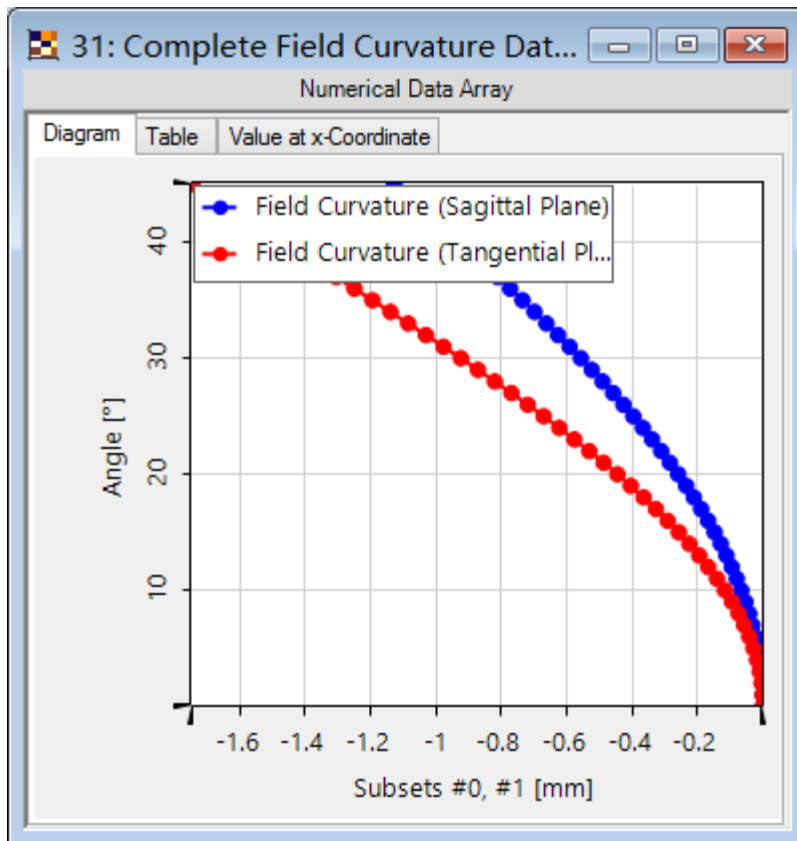
Start Element				Target Element		Linkage	
Index	Type	Channel	Medium	Index	Type	Propagation Method	On/Off
0	Plane Wave	-	Air in Homogeneous Medi...	3	Spherical Lens	Automatic Propagation Operator	On
3	Spherical Lens	T	Air in Homogeneous Medi...	4	Single Optical Interface	Automatic Propagation Operator	On
4	Single Optical Interface	T	N-BK7_Schott_2015 in Ho...	5	Optical Interface Sequence	Automatic Propagation Operator	On
5	Optical Interface Sequence	T	N-BK7_Schott_2015 in Ho...				

Simulation Engine: 803: Field Curvature Analyzer

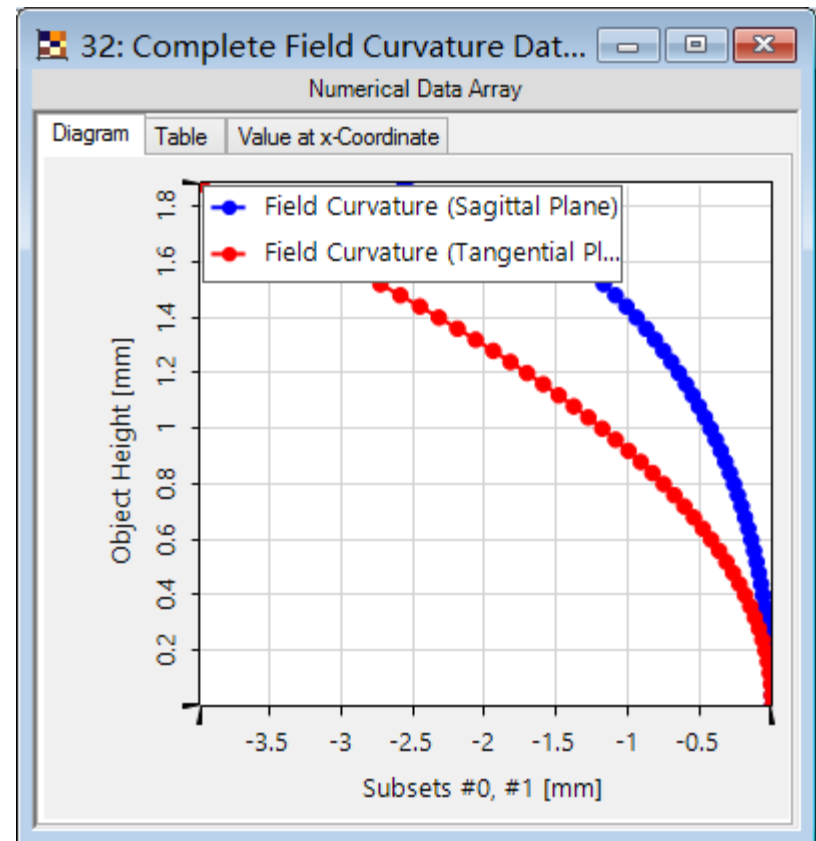
Go

Field Curvature of Spherical Lens

Field Curvature vs. Angle



Field Curvature vs. Object Height



Document & Technical Info

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