

LENS DESIGN

Special work areas of optical design:

- Collinear design of innovative optical system solutions with our software tool PARAX.
- Design of collinear start systems of zoom systems with the help of an automated parameter search.
- Conversion of the classic zoom optics to hybrid zoom systems and zoom systems without axial movements with only tunable lenses with the help of the investigation of the entire parameter space in the PARAX program.
- Design and simulation of complex optical systems with illumination and imaging beam paths with PARAX and ZEMAX
- Design and simulation of optical systems containing holographic and diffractive optical elements
- Design of hyperchromatic objective lenses (chromatic confocal sensor) and lens design for adaptive automotive head lights

Example library in the PARAX program:

- Example 1 – Telescope system
- Example 2 – Mikroskoptubus
- Example 3 – Lens + mirror
- Example 4 – Definierter Brennpunkt Abstand
- Example 5 – Projector
- Example 6 – Köhler illumination + microscope
Dimensioning of illumination + imaging beam path
- Example 7 – Illumination for an Operations microscope
Incident light illumination, use of deflecting functional elements
- Example 8 – Centering microscope
- Example 8A - Modified centering microscope
Minimum size for a prism
- Example 9 – Incident light illumination
- Example 10 - Peephole
- Example 11 - Camera viewfinder
+ Extension to real system
- Example 12 - Laser Focusing System
- Example 13 - Camera for luminance measurements
- Example 14 - Retinal camera ,
Imaging and illumination beam path
- Example 15 – Zoom system
Consideration of the curves of the moving partial optics to control the local distances between the moving elements

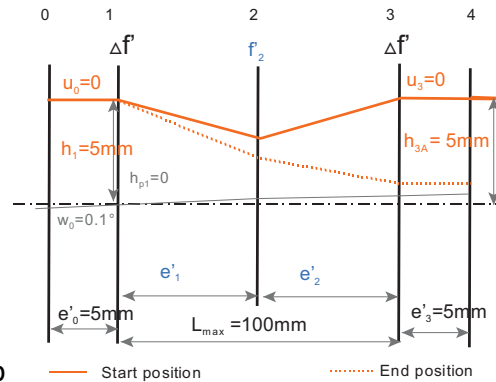


Figure 1: Input parameters for the PARAX program. We are looking for the collinear starting system for a zoom telescope with tunable lenses.

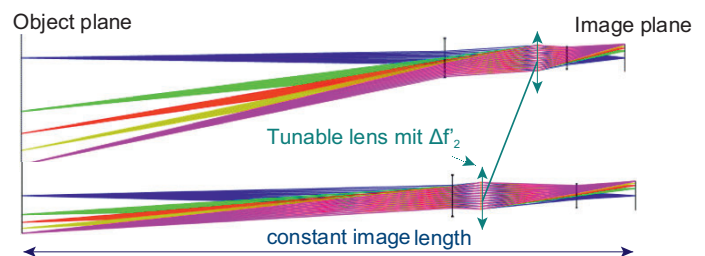


Figure 2: Collinear start system, determined with PARAX for a hybrid zoom endoscope optics. The tunable lens also moves linearly to keep the image length constant.

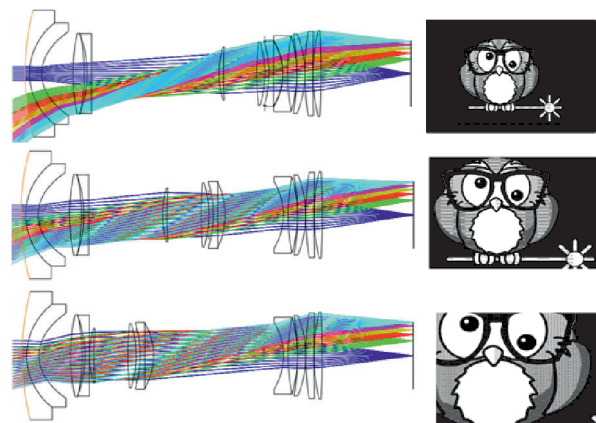


Figure 3: Optimized hybrid zoom photo lens with a tunable lens for an APS-C sensor. Zoom range: $f' = 17\text{mm}$ to 51mm .

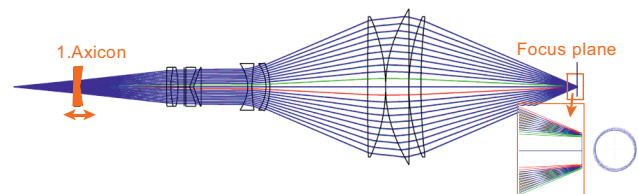


Figure 4: Optical system for generating a ring focus with a variable diameter by moving an axicon in front of the telescope optics.spotlight

