Section 1
Optics 101
(on a Budget)

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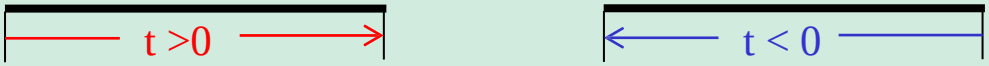
Goals and "Not Goals"

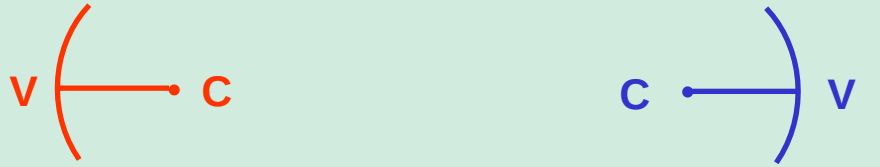
- Goals:
  - Brief overview of basic imaging concepts
  - Introduce some lingo of lens designers
  - Provide resources for quick reference or further study
- Not Goals:
  - Derivation of equations
  - Explain all there is to know about optical design
  - Explain how CODE V works

Sign Conventions

- Distances: positive to right

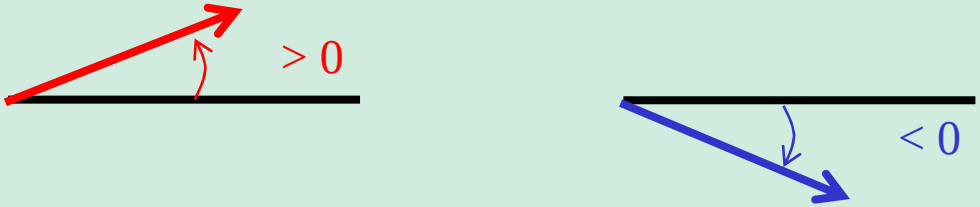


- Curvatures: positive if center of curvature lies to right of vertex



$c = 1/r > 0$ $\qquad$ $c = 1/r < 0$

- Angles: positive measured counterclockwise



- Heights: positive above the axis

Light from Physics 102

- Light travels in straight lines (homogeneous media)
- Snell's Law: *n sin = n' sin '*
- Paraxial approximation:
  - Small angles: *sin ~ tan ~ ;* and *cos ~ 1*
  - Optical surfaces represented by tangent plane at vertex
    - ignore sag in computing ray height
    - thickness is always center thickness
  - Power of a spherical refracting surface:
    *1/f = = (n'-n)*c*
  - Useful for tracing rays quickly and developing aberration theory

Cardinal Points

- 6 important points along the axis of an optical system
  - 2 focal points (front and back):
    input light parallel to the axis crosses the axis at focal points F and F’
  - 2 principal points (primary and secondary):
    extend lines along input ray and exiting focal ray; where they intersect defines principal “planes” which intersect the axis at the principal points
  - 2 nodal points (first and second): rays aimed at the first appear to emerge from the second at the same angle.
  - “first” points defined by parallel rays entering from the right; “second” points defined by parallel rays entering from the left

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：https://d.book118.com/955030231144011101