

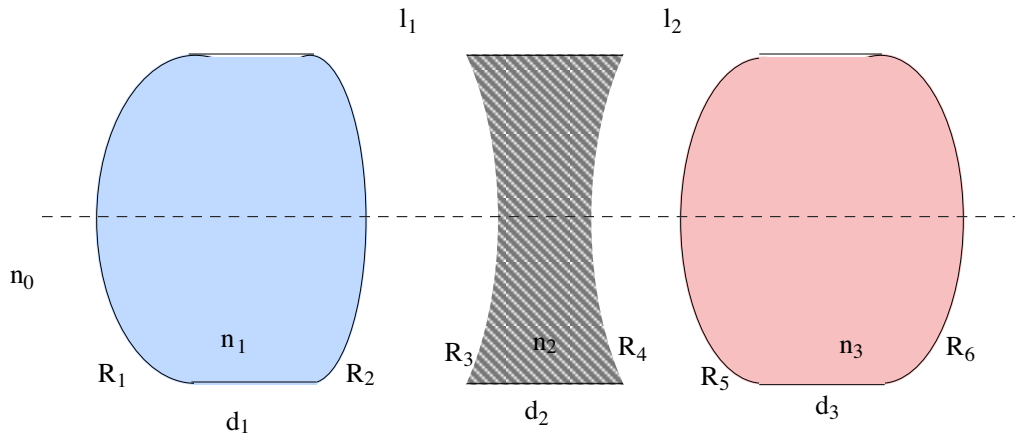


PHYS 3800 “Optics”



Homework #4: Geometric Optics “Determine System matrix” Spring 2002

Find the system matrix for a Cooke triple camera lens. Light is entering from the left encounters six spherical surfaces whose radii of curvature are, in turn, R_1 to R_6 . The thickness of the three lenses are, in turn, d_1 to d_3 , and the refractive indices are n_1 to n_3 . The first and second air separation between lens surfaces are l_1 and d_1 .



Radii	Thickness	Distance	Refractive index
$R_1 = 19.4 \text{ mm}$	$d_1 = 4.29 \text{ mm}$	$l_1 = 1.63 \text{ mm}$	$n_1 = 1.6110$
$R_2 = -128.3 \text{ mm}$	$d_2 = 0.93 \text{ mm}$	$l_2 = 12.9 \text{ mm}$	$n_2 = 1.5744$
$R_3 = -57.8 \text{ mm}$	$d_3 = 3.03 \text{ mm}$		$n_3 = 1.6110$
$R_4 = 18.9 \text{ mm}$			
$R_5 = 311.3 \text{ mm}$			
$R_6 = -66.4 \text{ mm}$			

- Calculate the system matrix and sketch the lens system with its cardinal points.
- How far behind the last surface must the film plane occur to focus paraxial rays?