

Console

Enter the number of sequential elements(lenses) 4

Enter the focal lengths of sequential elements in order

--> 4

--> -2

--> 9

--> -12

Enter the input angle(in radian)0.3

Enter the input height0.14

Enter the object distance3

Enter the distance between lenses in order

--> 22

--> 18

--> 9

The lens matrices are

1. -0.25

0. 1.

1. 0.5

0. 1.

1. -0.11111111

0. 1.

1. 0.0833333

0. 1.

The image distance from the last lens of cascade is

19.57047

The image matrices are

1. 0.
-12. 1.

1. 0.
-1.8888889 1.

1. 0.
16.438776 1.

1. 0.
19.57047 1.

The object distance matrices are

1. 0.
3. 1.

1. 0.
34. 1.

1. 0.
19.888889 1.

1. 0.
-7.4387755 1.

The composite matrix for whole cascade of lenses

-2.0694444 1.125
-4.828D-16 -0.4832215

Angular Magnification by cascade of lenses is

-2.0694444

Spatial Magnification by cascade of lenses is

-0.4832215

alpha_out is

-0.4633333

x_out is

-0.067651