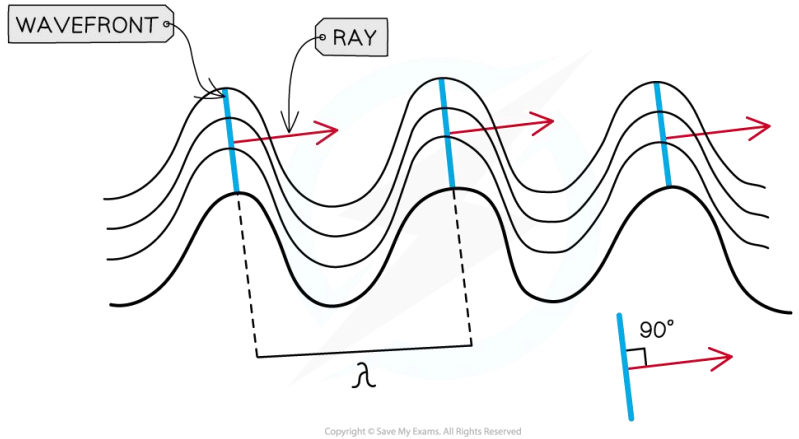
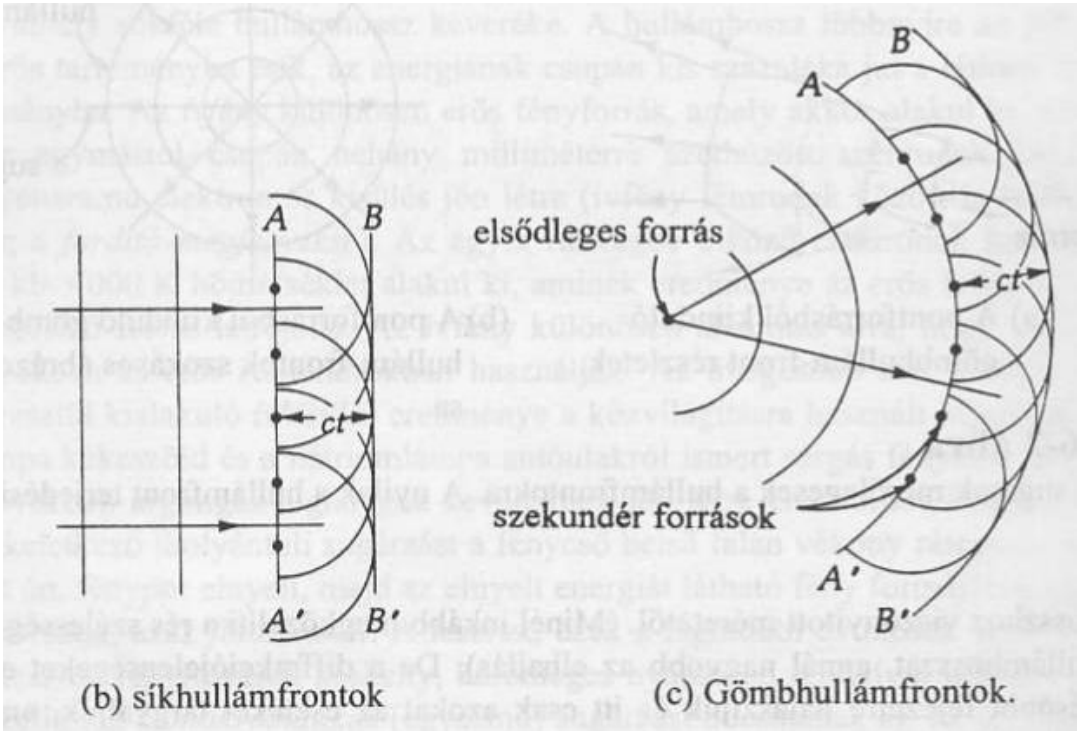
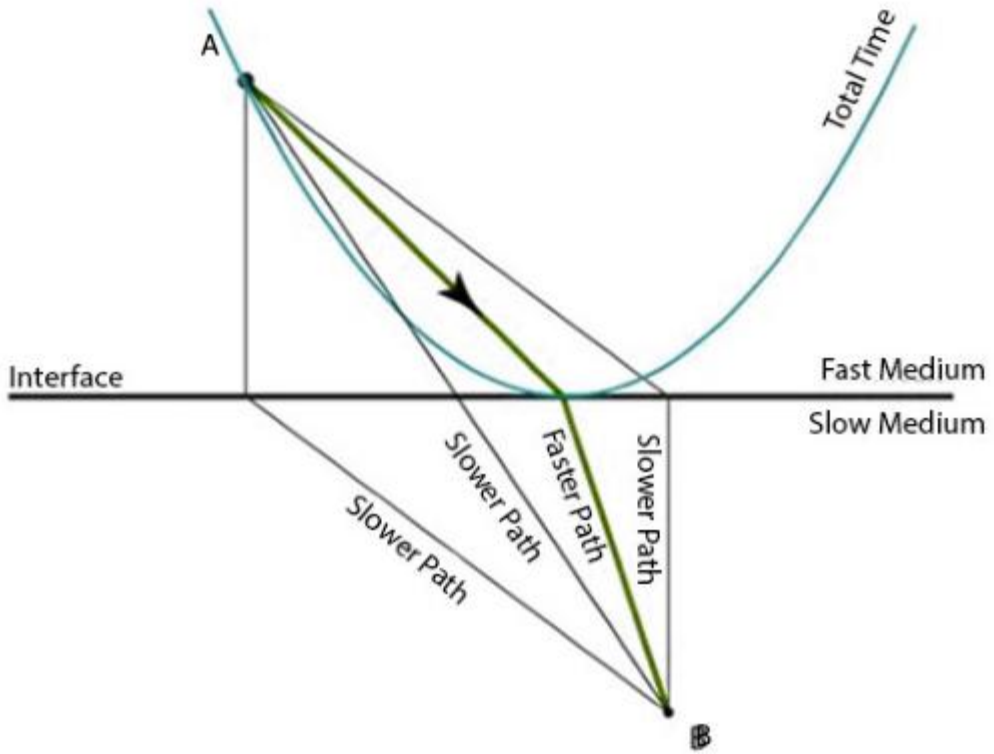
Ismétlés



Huygens-elv



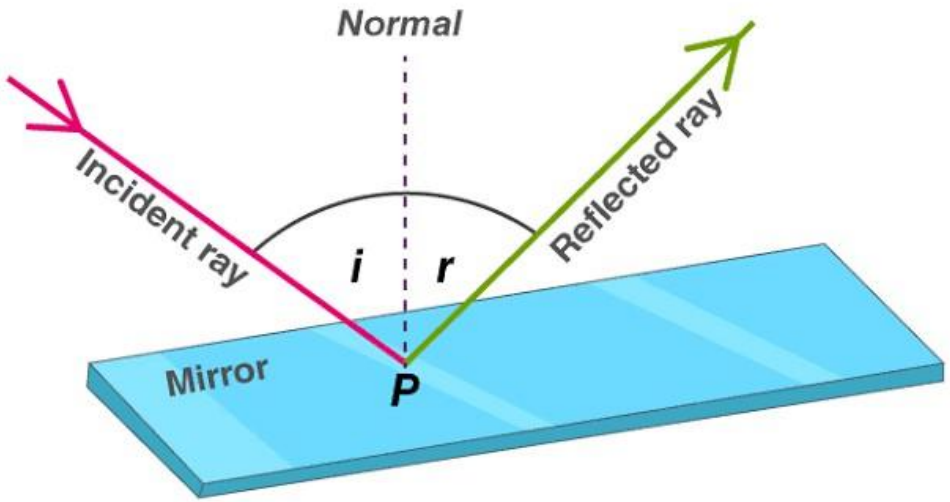
Fermat-elv



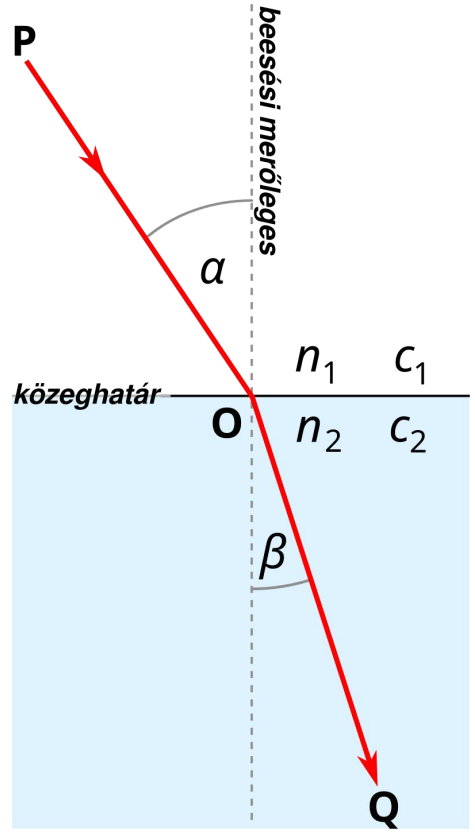
Ismétlés

$$\frac{\sin\alpha}{\sin\beta} = \frac{n_2}{n_1} = n_{2,1}$$

Reflexió - fényvisszaverődés



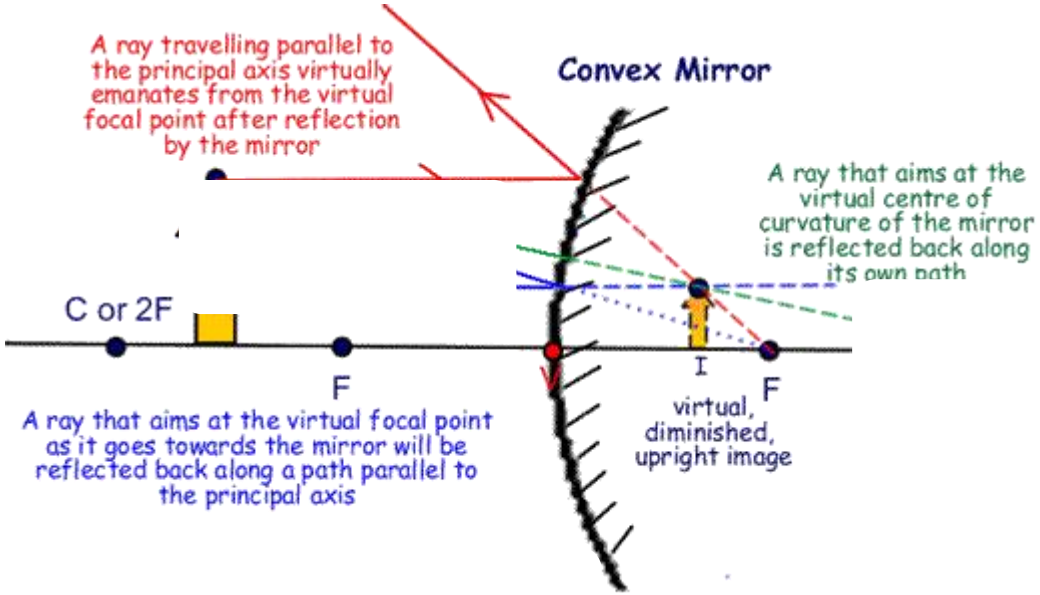
Refrakció - fénytörés

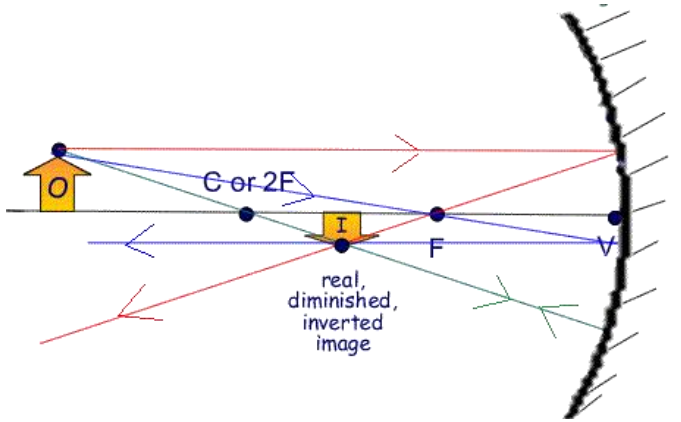


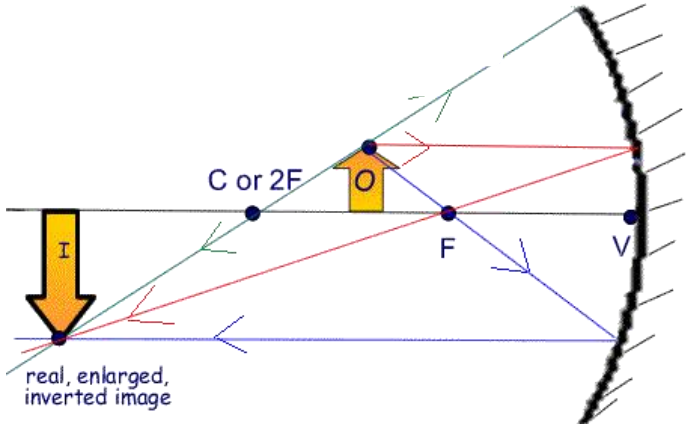
Geometriai optika 2

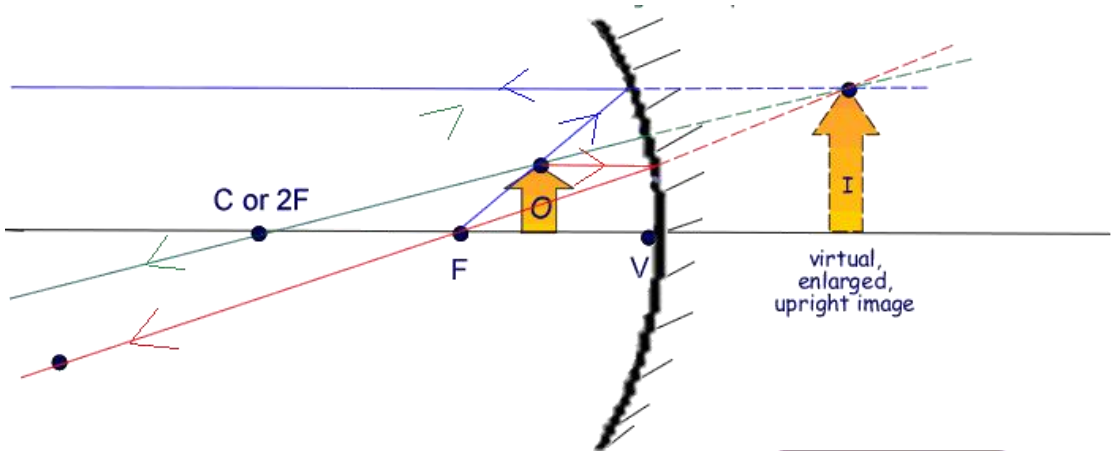
Lencsék és tükrök sugármenetei:
https://phet.colorado.edu/sims/html/geometric-optics/latest/geometric-optics_all.html

Tükrök - Gömbtükrök





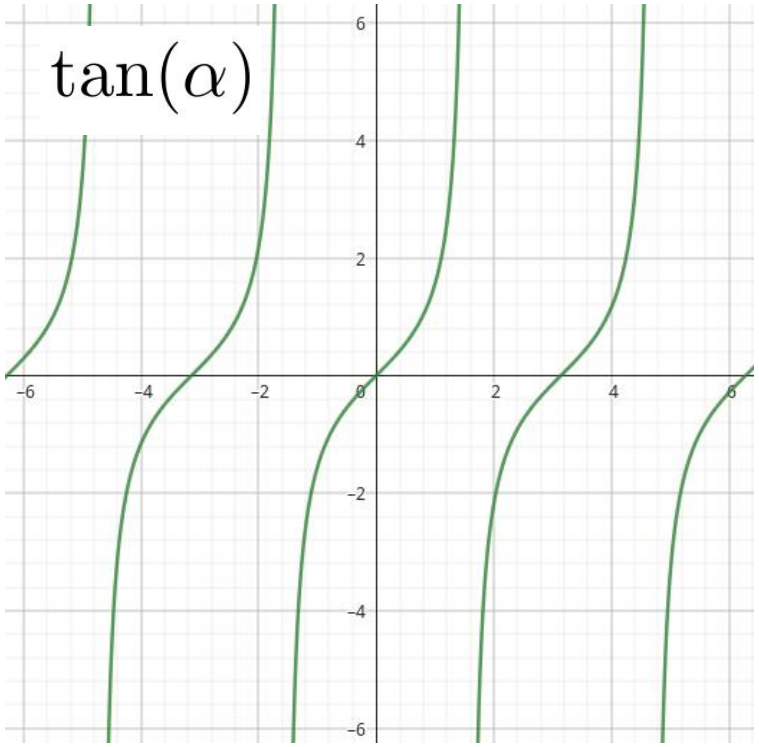


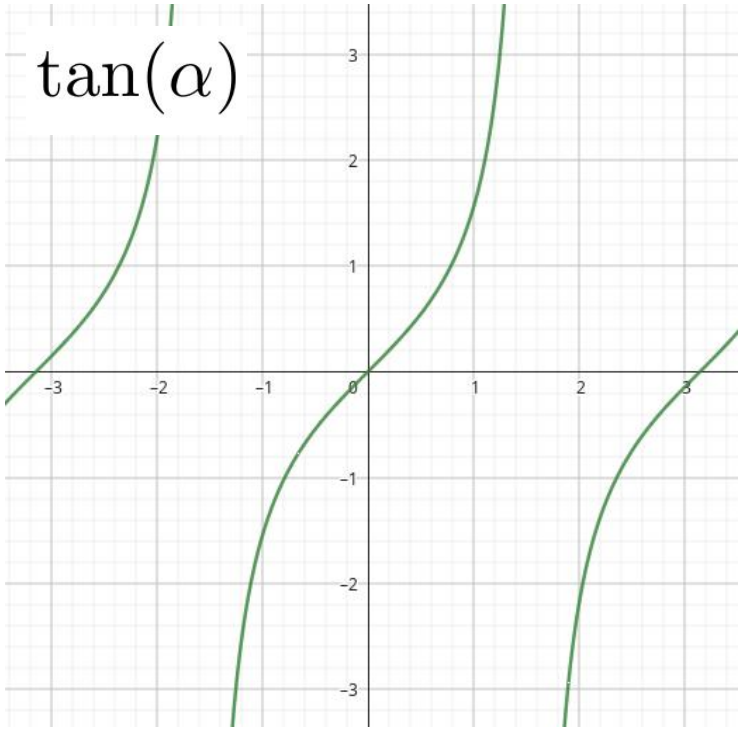


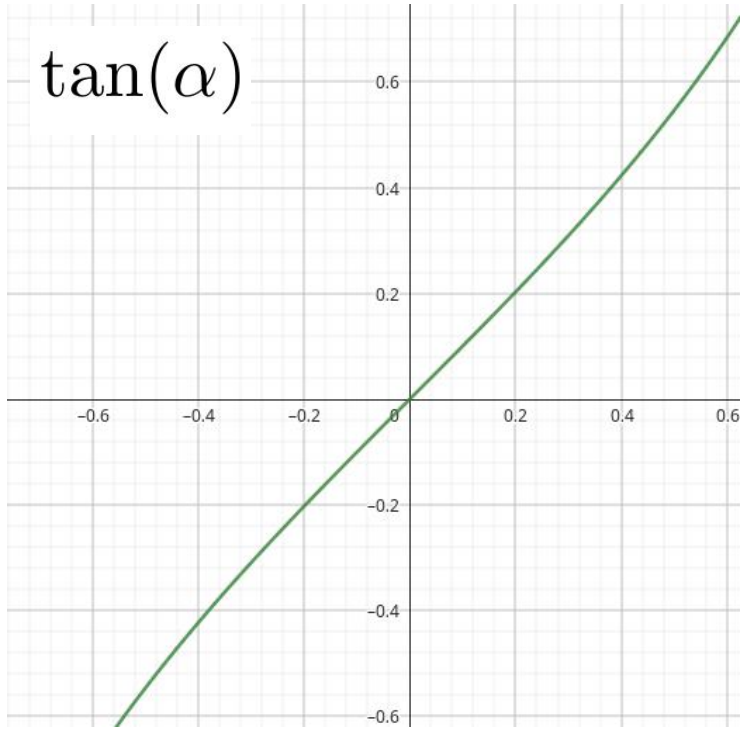
Leképezési törvény:

$$\frac{1}{t} + \frac{1}{k} = \frac{1}{f}$$

Paraxiális közelítés



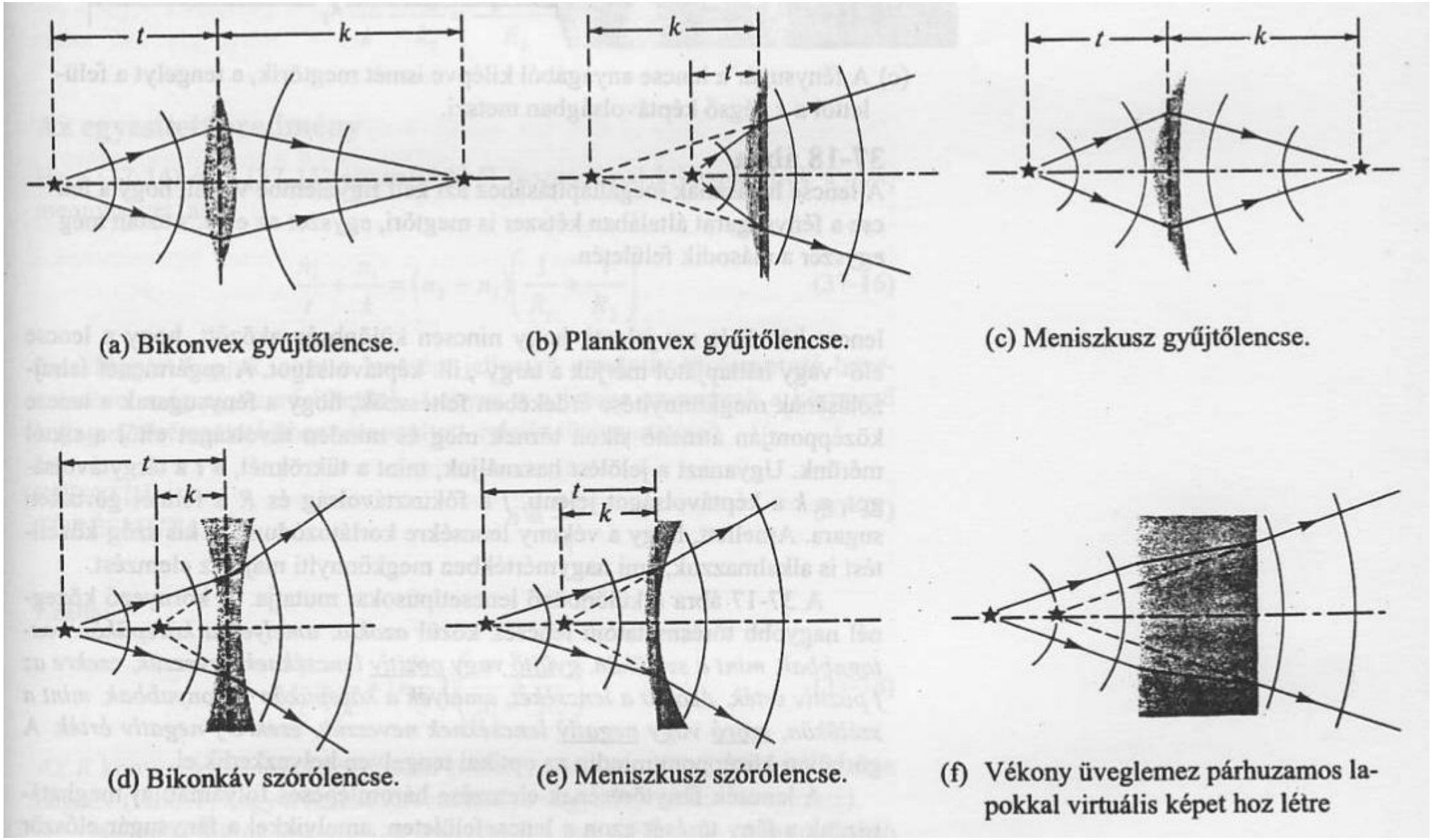




$$\tan(\alpha) \approx \alpha$$

$$\sin(\alpha) \approx \alpha$$

Lencsék - Vékony lencsék



(a) Bikonvex gyűjtőlencse.

(b) Plankonvex gyűjtőlencse.

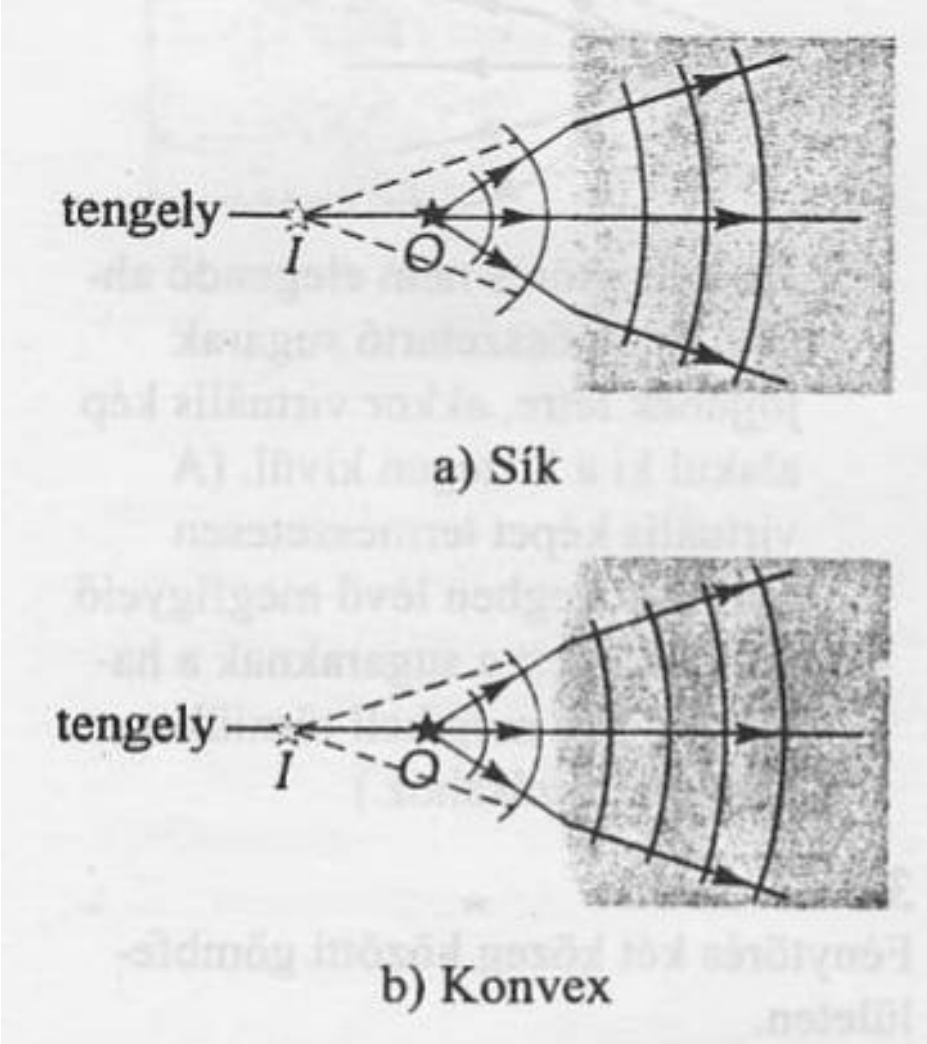
(c) Meniszkusz gyűjtőlencse.

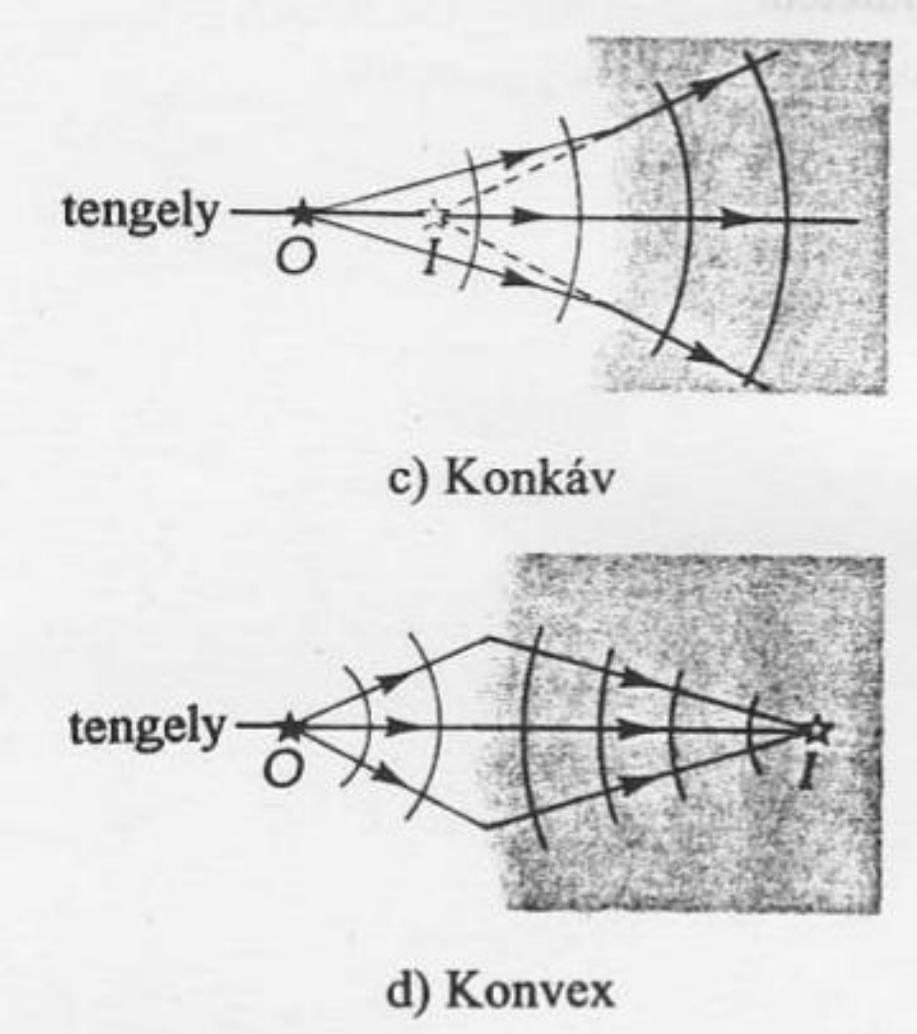
(d) Bikonkáv szórólencse.

(e) Meniszkusz szórólencse.

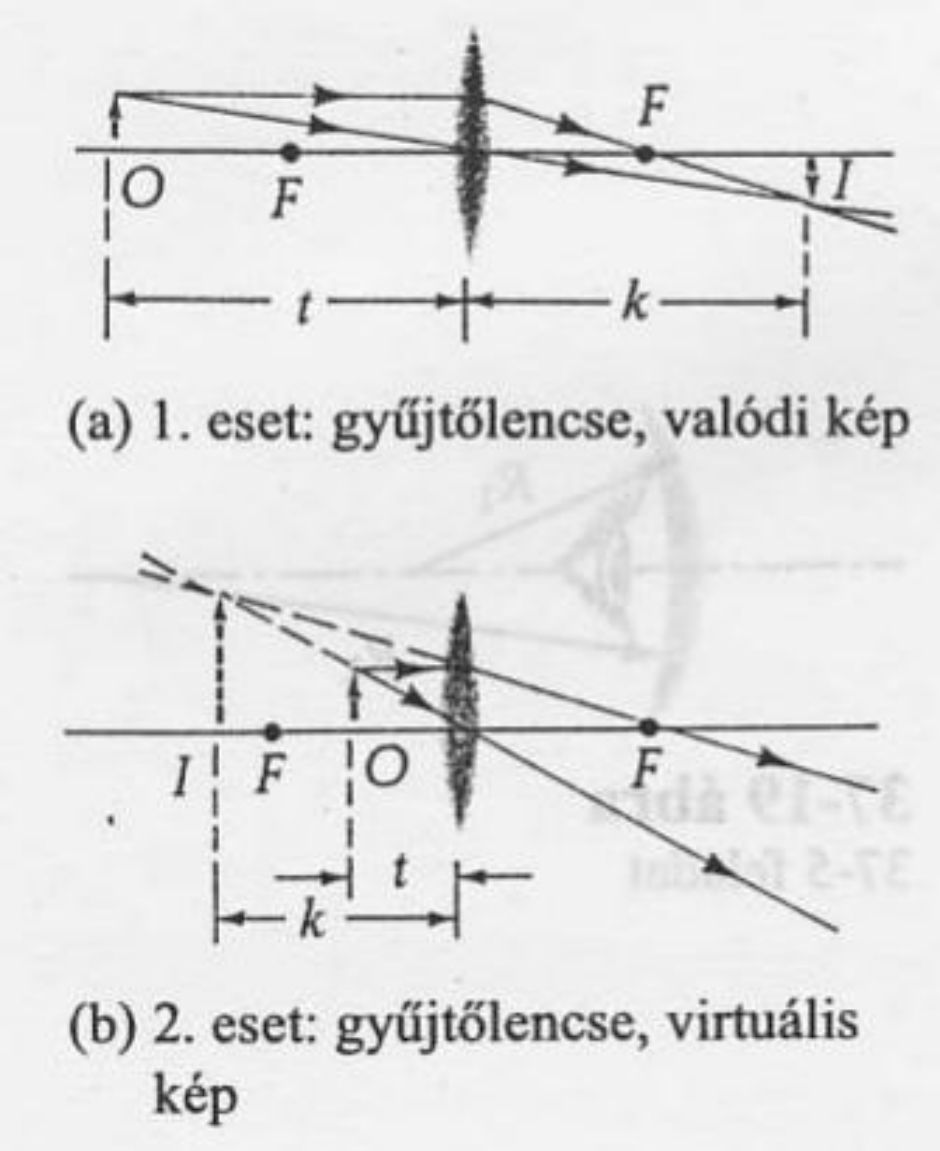
(f) Vékony üveglemez párhuzamos lapokkal virtuális képet hoz létre

Lencsék - Fénytörés gömbfelületen



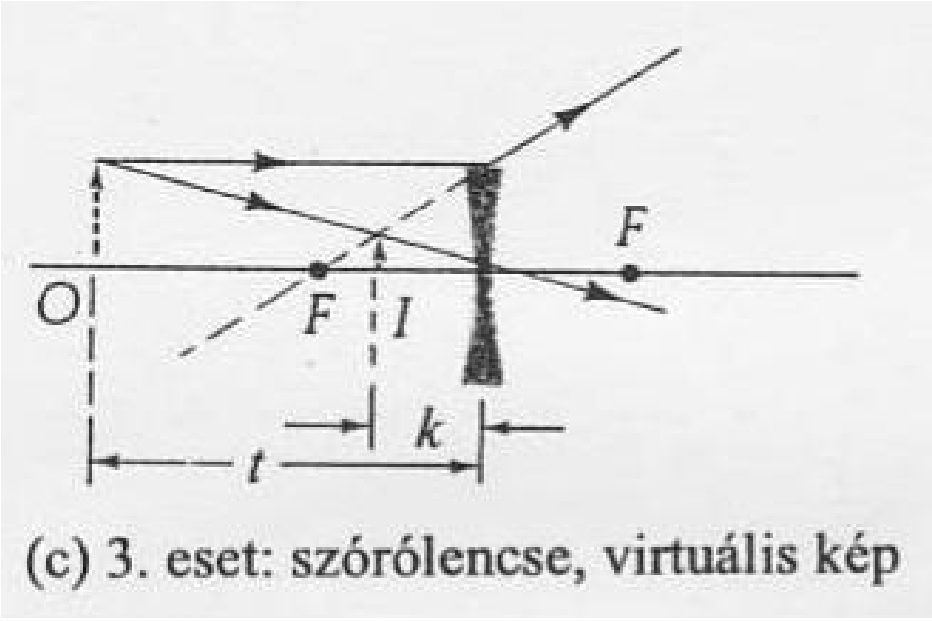


Lencsék nevezetes sugármenetei



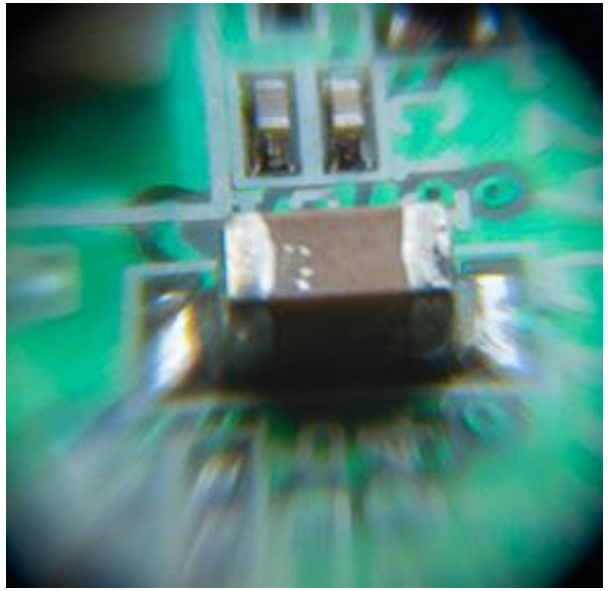
(a) 1. eset: gyűjtőlencse, valódi kép

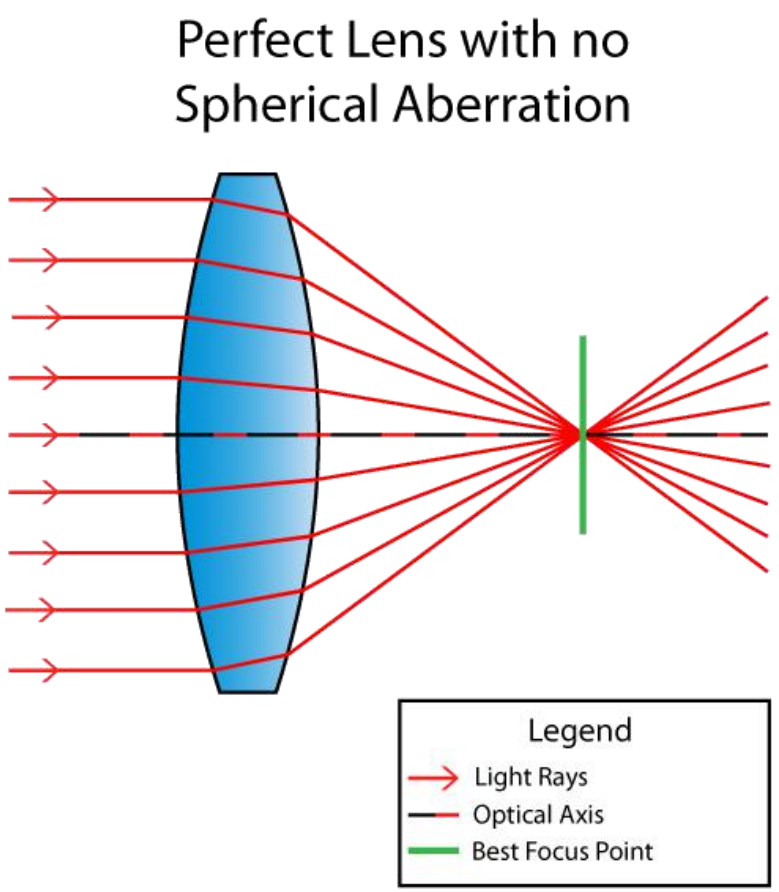
(b) 2. eset: gyűjtőlencse, virtuális kép

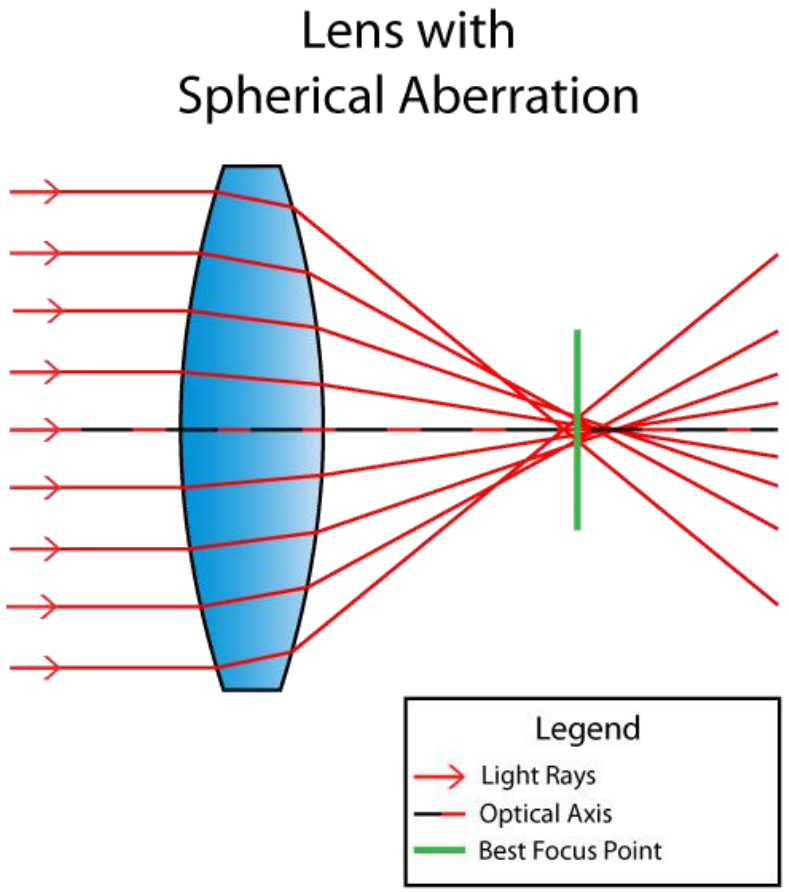


(c) 3. eset: szórólencse, virtuális kép

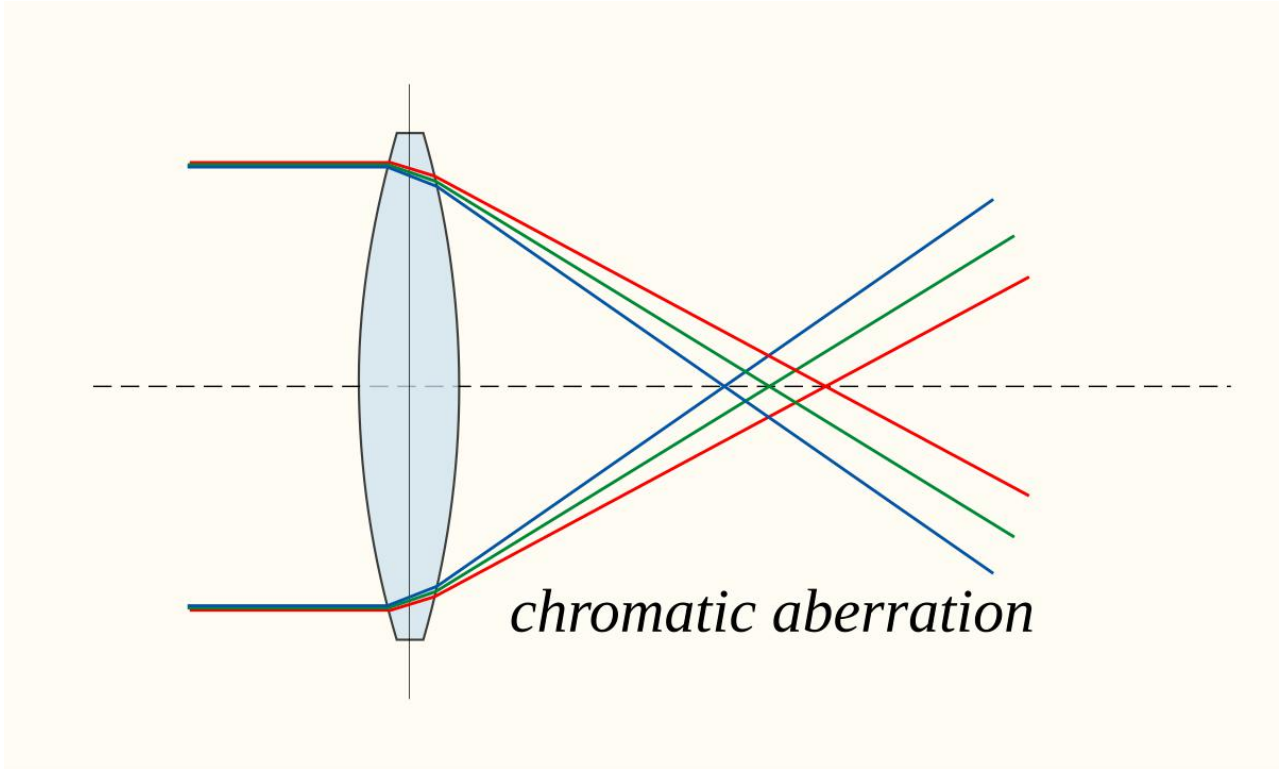
Lencsehibák - Szférikus aberráció

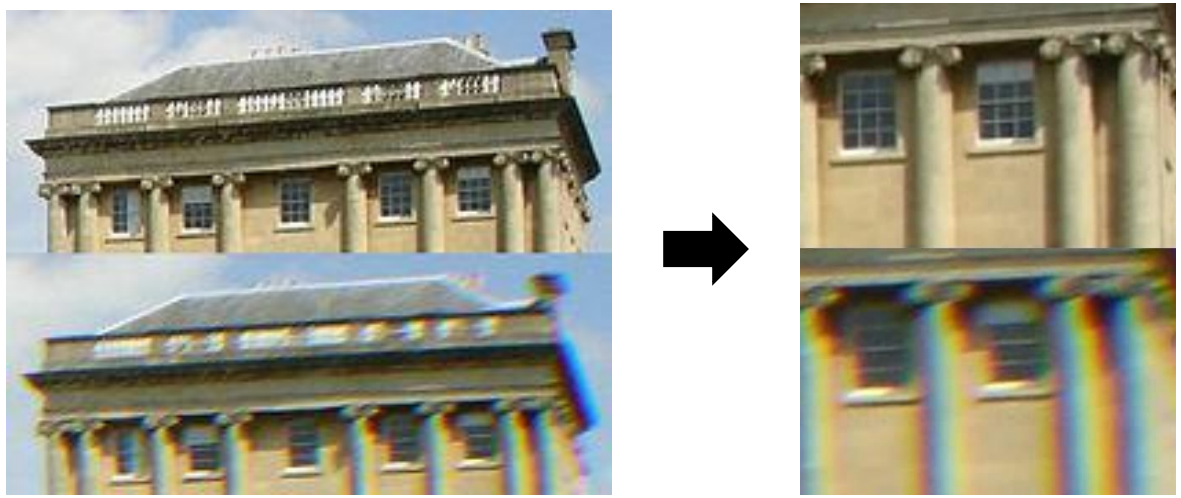


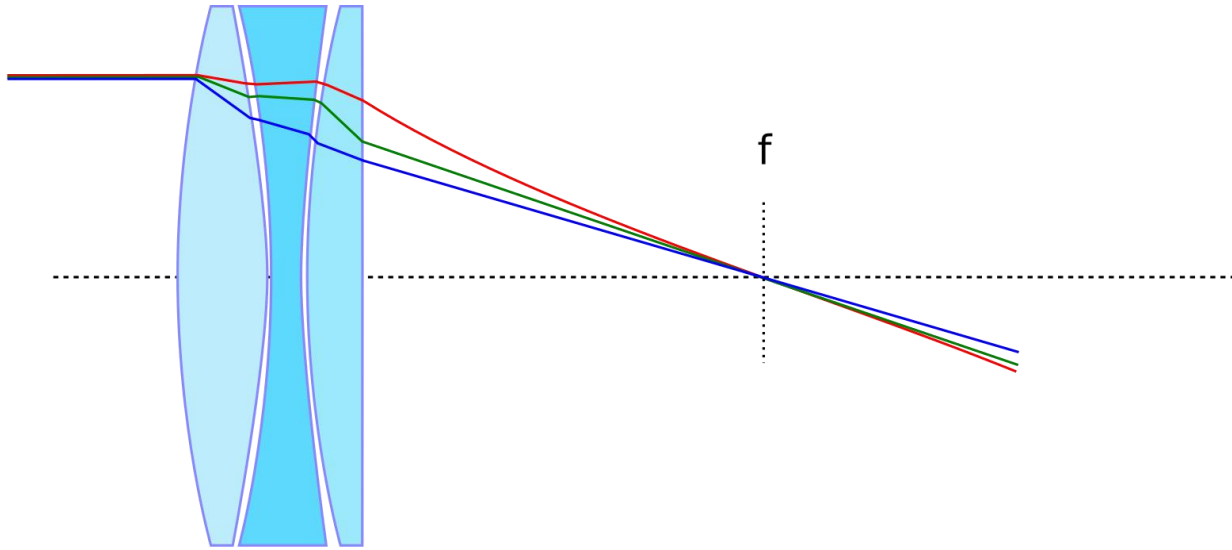




Lencsehibák - Kromatikus aberráció

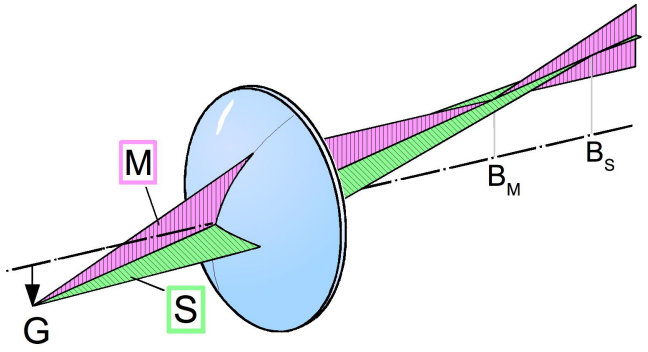




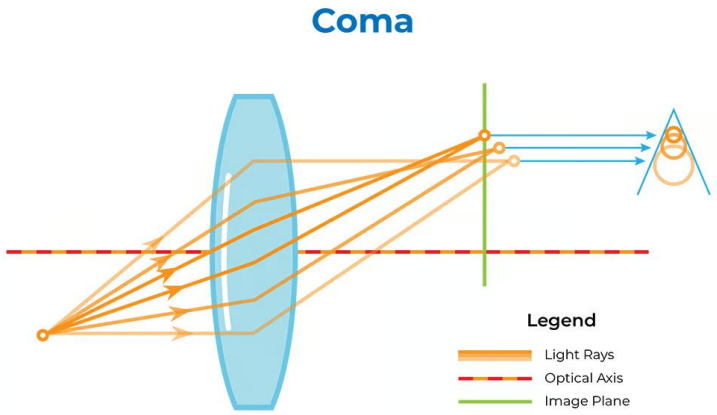


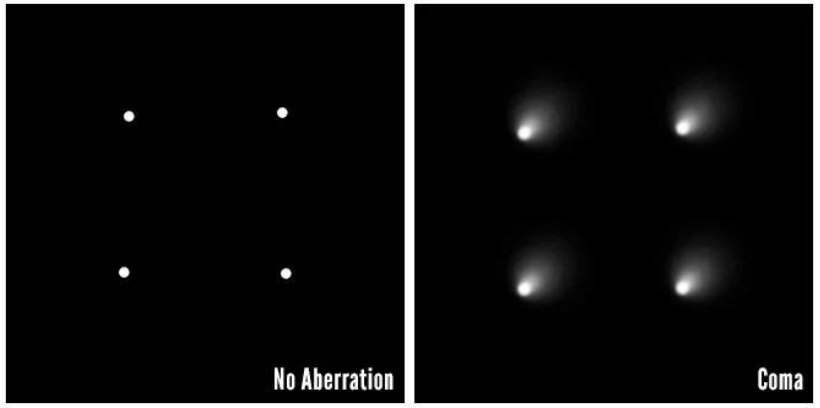
Lencsehibák

Asztigmatizmus



Kóma





Képmezőelhajlás