Physique – Optique
Chapitre 3 – Lentilles minces

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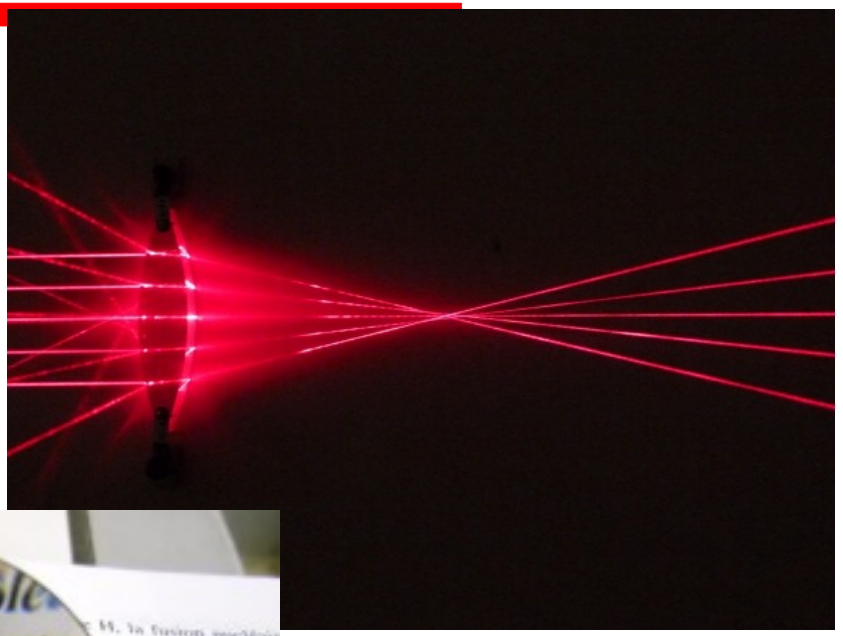
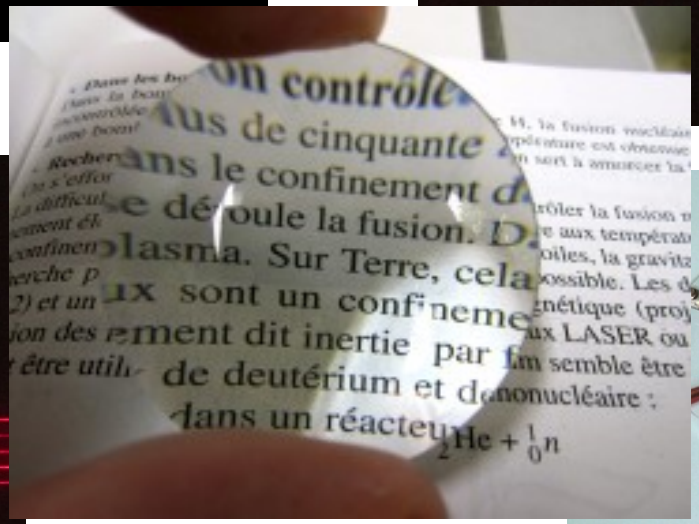
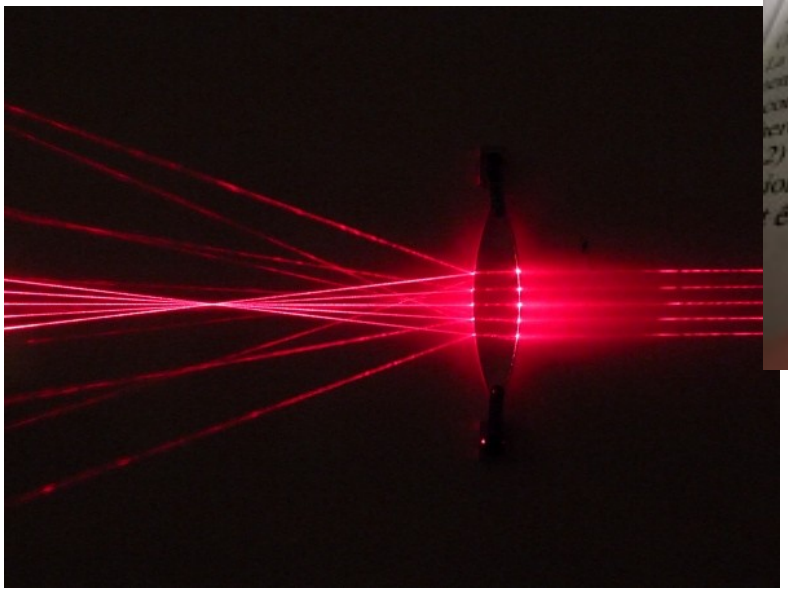
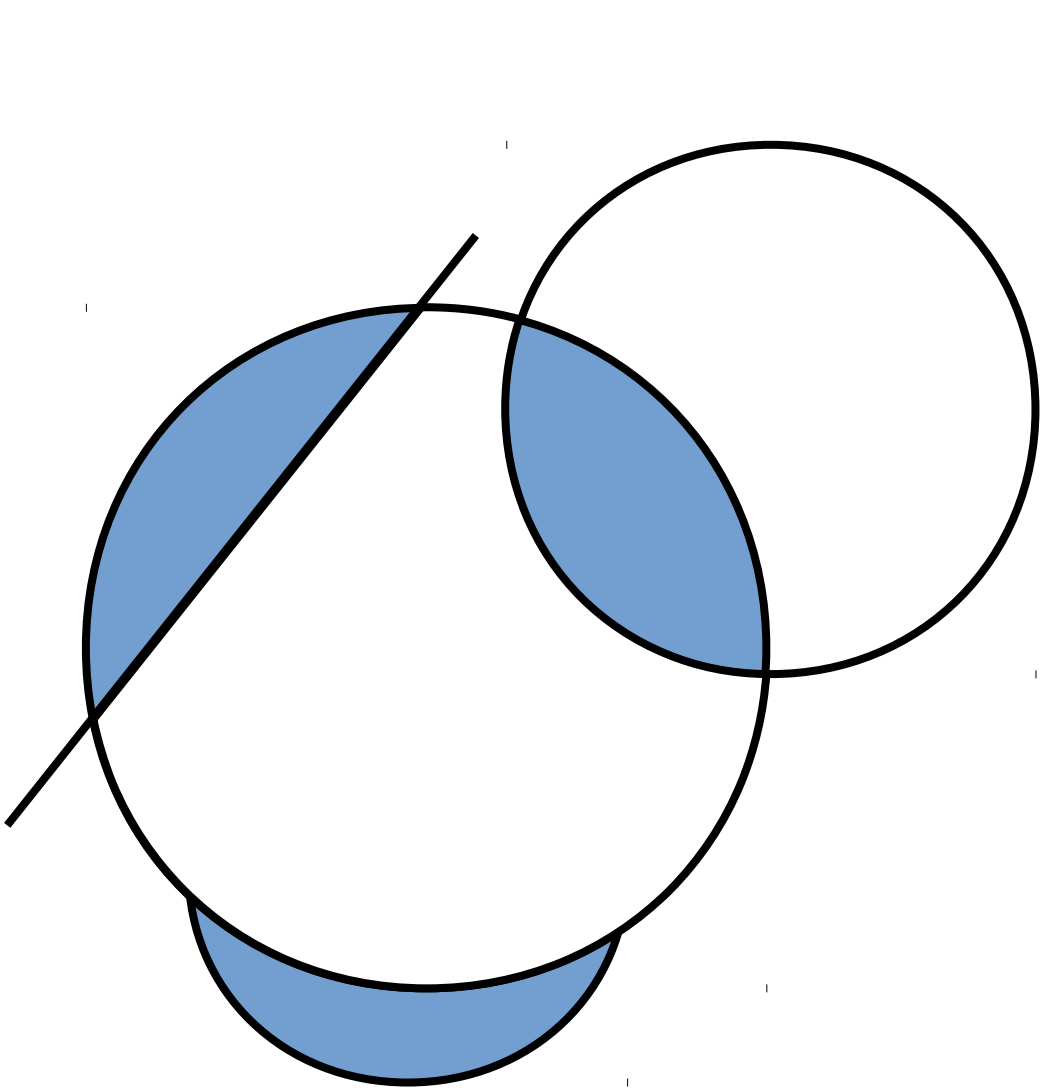
Imagier...

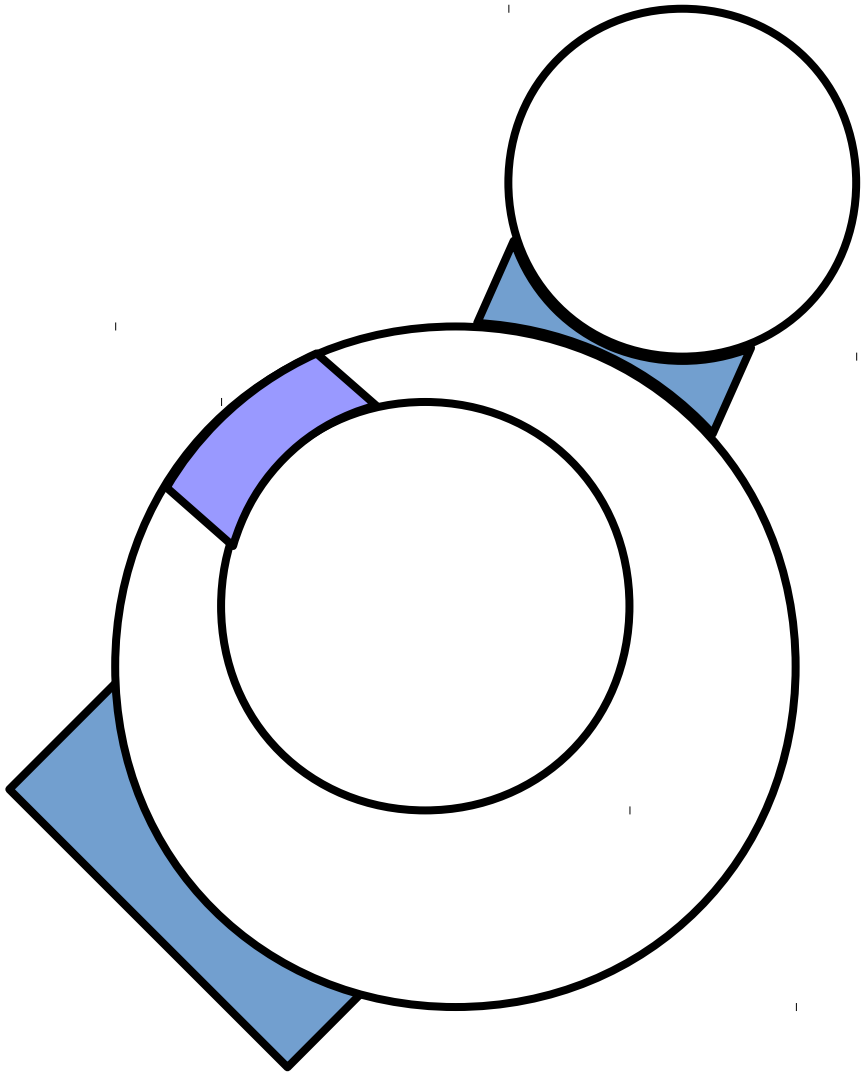






Définition générale

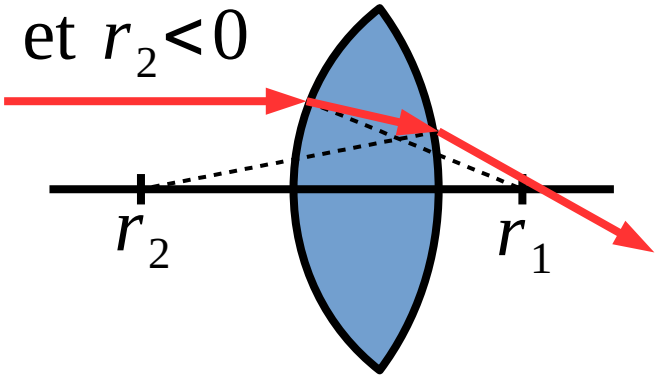




Les lentilles convergentes

Lentille bi-convexe :

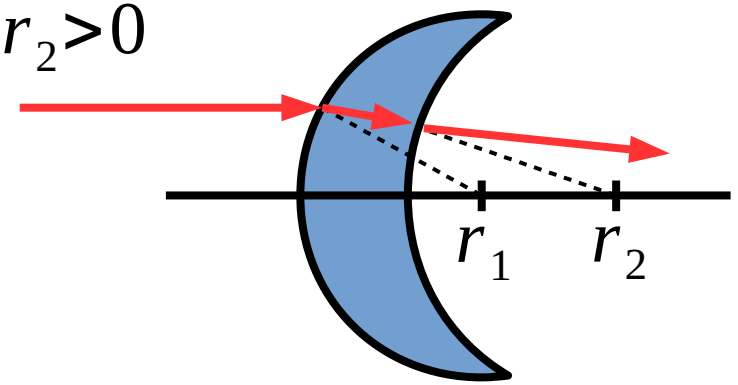
$r_1>0$ et $r_2<0$



Lentille ménisque convergent :

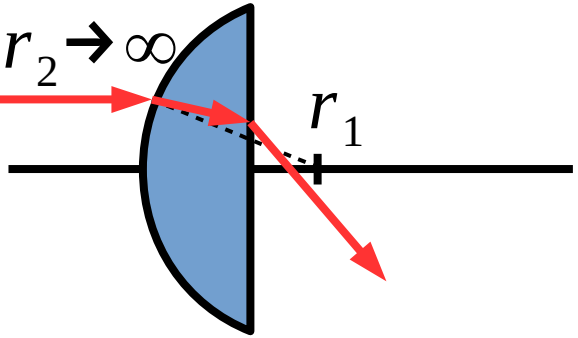
$r_1>0$ et $r_2>0$

$r_2>r_1$



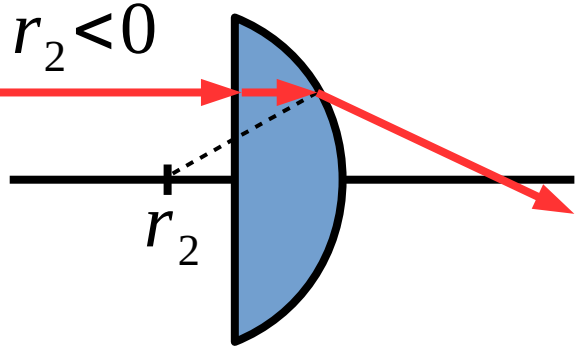
Lentille plan-convexe :

$r_1>0$ et $r_2\rightarrow\infty$



ou

$r_1\rightarrow\infty$ et $r_2<0$

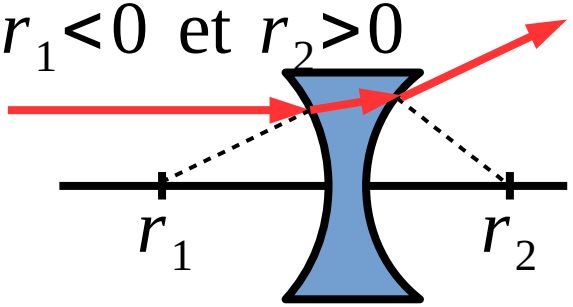


Symbole :

Les lentilles divergentes

Lentille bi-concave :

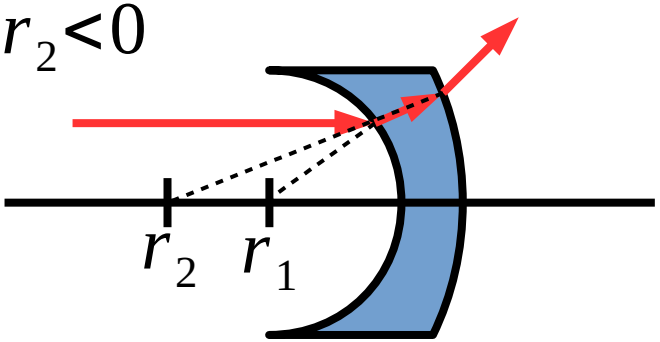
$r_1<0$ et $r_2>0$



Lentille ménisque divergent :

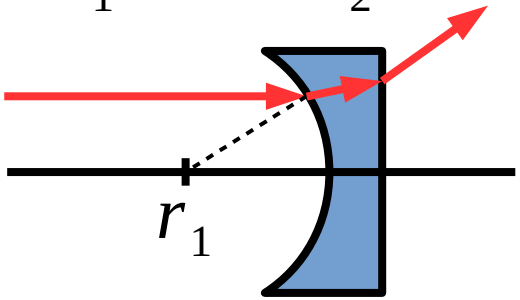
$r_1<0$ et $r_2<0$

$r_2>r_1$



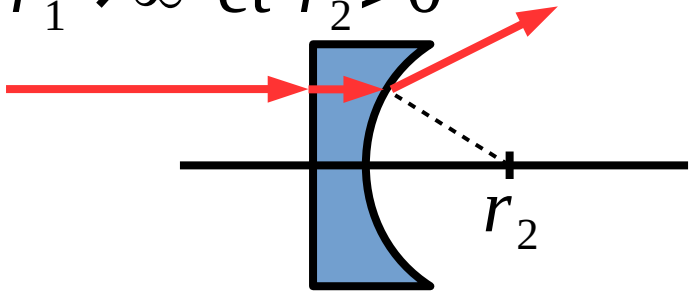
Lentille plan-concave :

$r_1<0$ et $r_2\rightarrow\infty$

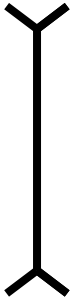


ou

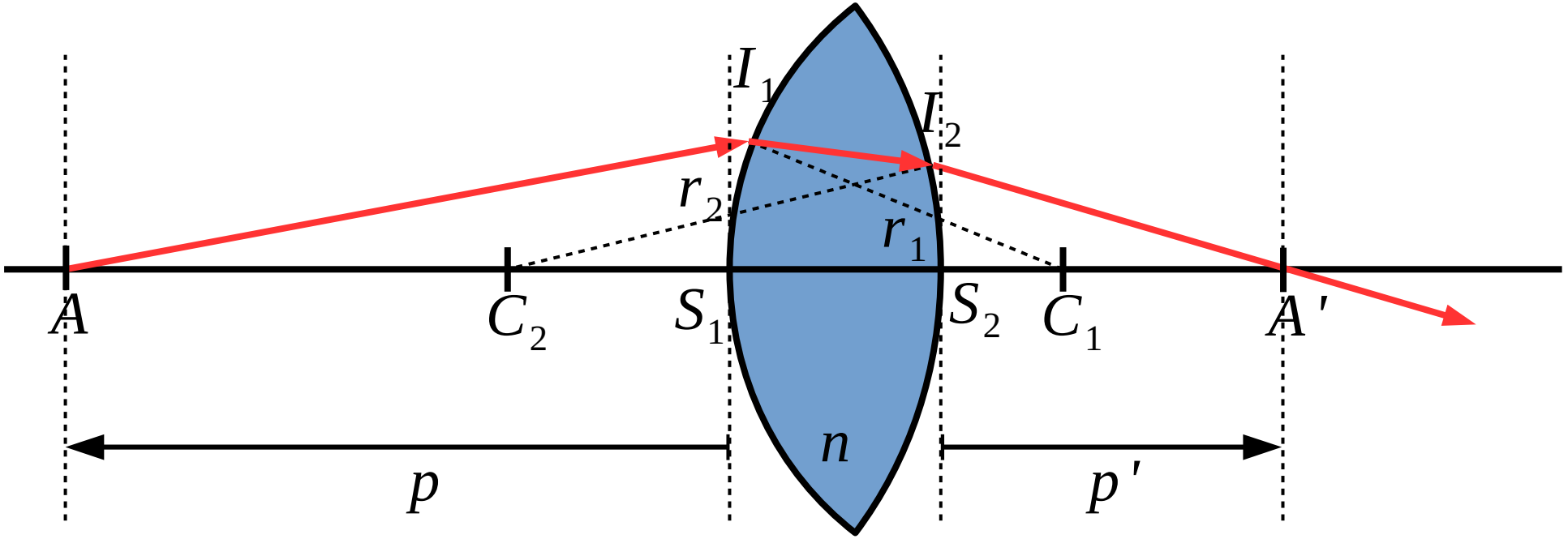
$r_1\rightarrow\infty$ et $r_2>0$



Symbole :



Relation de conjugaison des lentilles minces



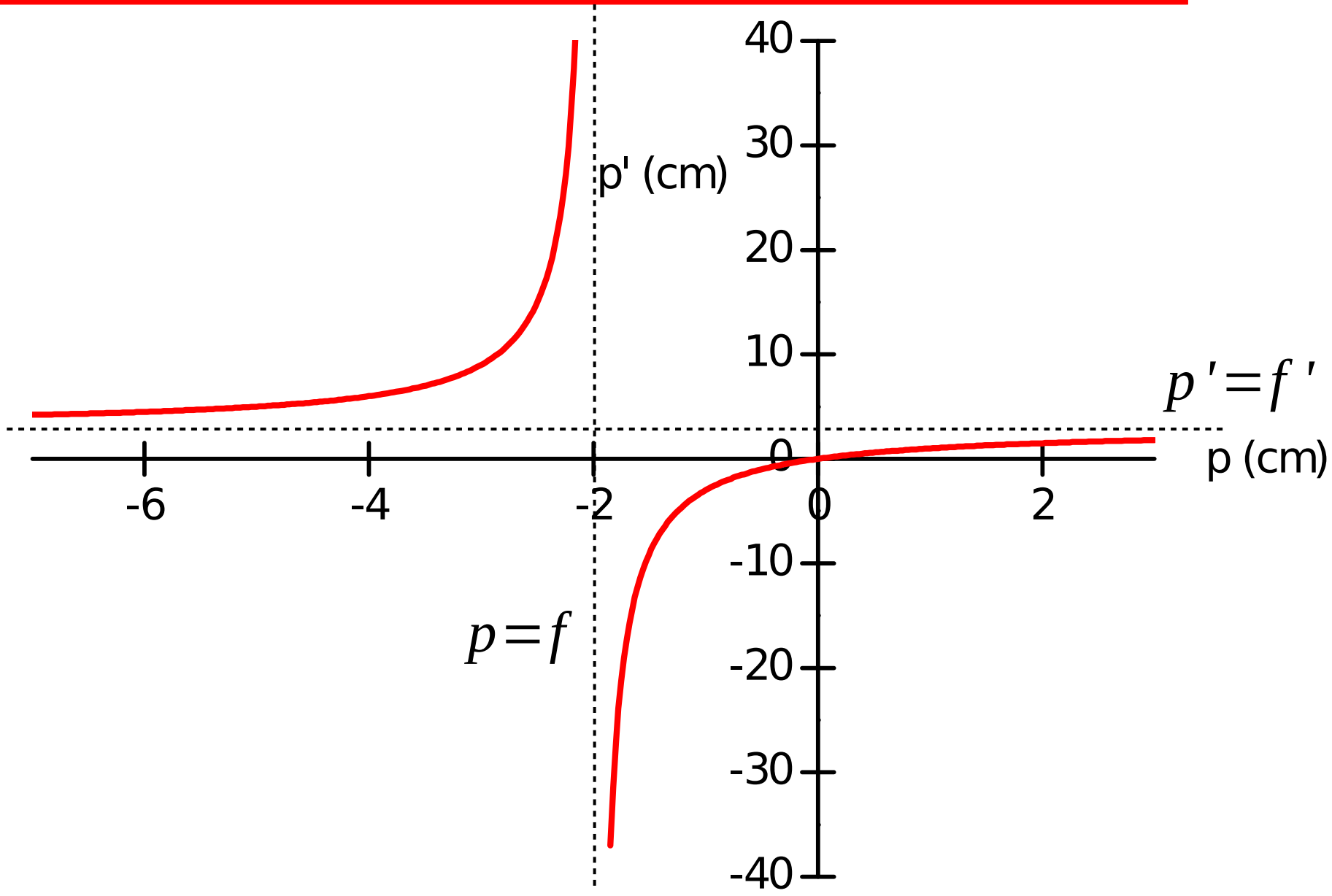
Relation de conjugaison :

$$\frac{1}{p'}-\frac{1}{p}=(n-1)\left(\frac{1}{r_1}-\frac{1}{r_2}\right)$$

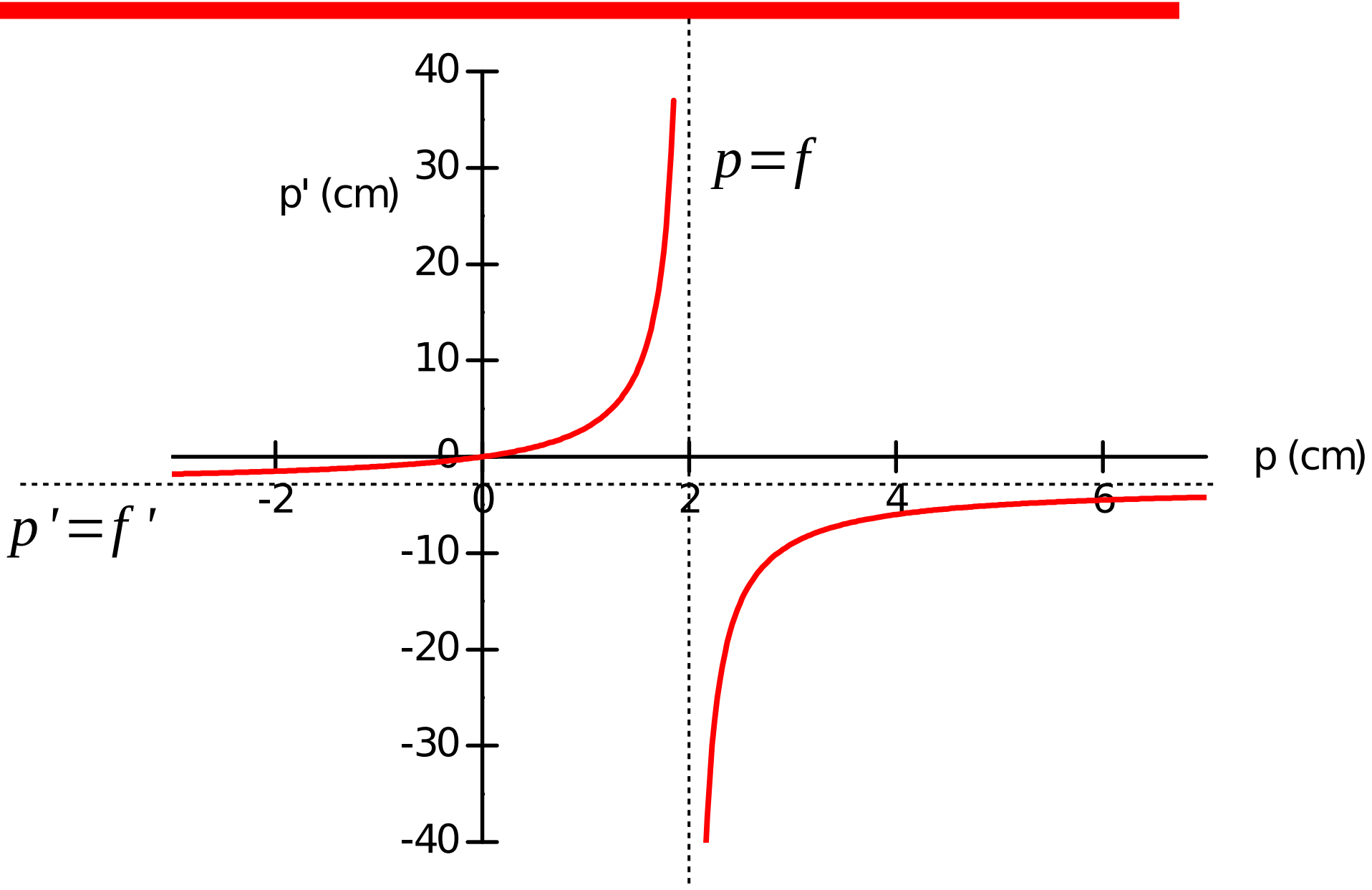
Vergence de la lentille :

$$\phi=(n-1)\left(\frac{1}{r_1}-\frac{1}{r_2}\right)$$

Lentilles convergentes



Lentilles divergentes



Études des foyers

Foyer image F'

– Position de l'image lorsque l'objet est à l'infini

$$p \to \infty \text{ et } p' = f'$$

– Distance focale image

$$\overline{SF'} = f' = \frac{1}{\Phi}$$

Foyer objet F

– Position de l'objet pour envoyer l'image à l'infini

$$p = f \text{ et } p' \to \infty$$

– Distance focale objet

$$\overline{SF} = f = -\frac{1}{\Phi}$$

Lois de conjugaison

1ière forme

$$\frac{1}{p'_2} - \frac{1}{p_1} = (n-1)\left(\frac{1}{r} - \frac{1}{r'}\right)$$

2e forme

$$\frac{1}{p'} - \frac{1}{p} = \frac{1}{f'} = -\frac{1}{f}$$

3e forme

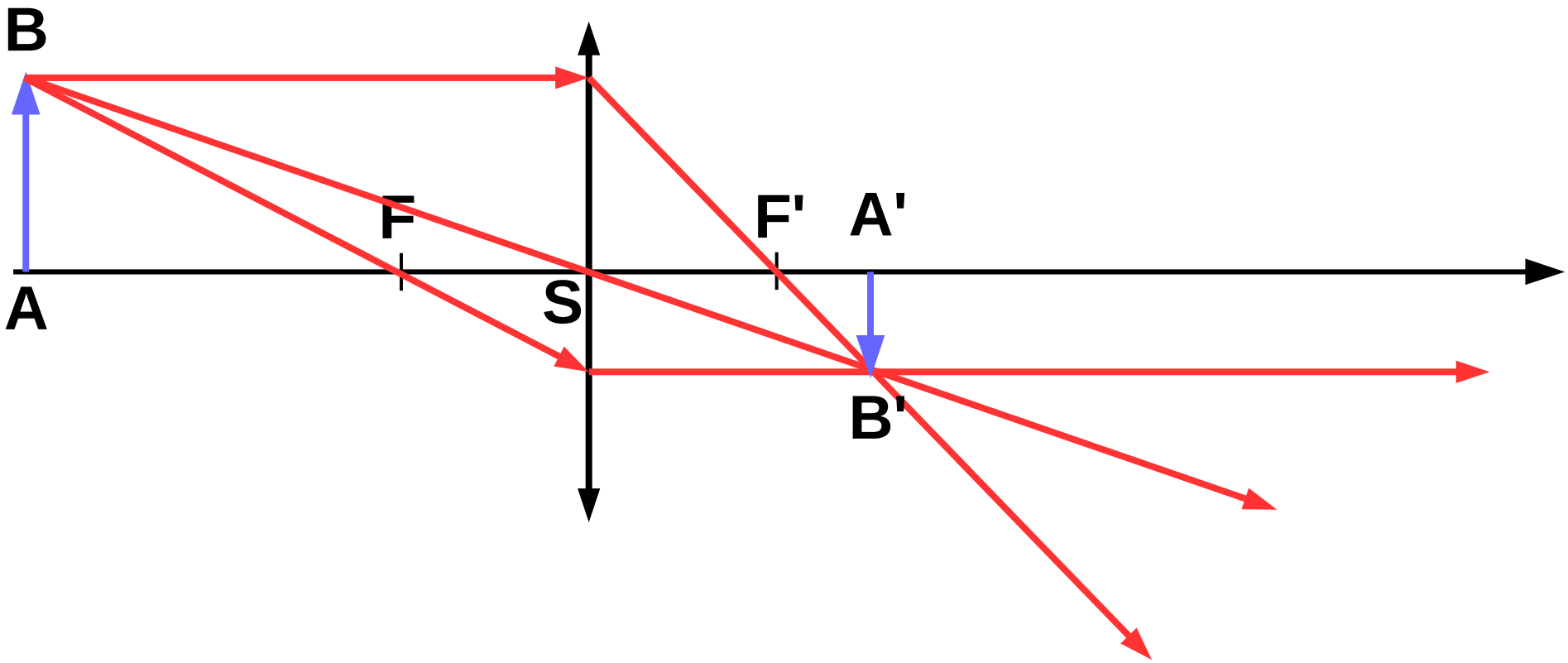
$$\frac{f'}{p'} + \frac{f}{p} = 1$$

Relation de Newton

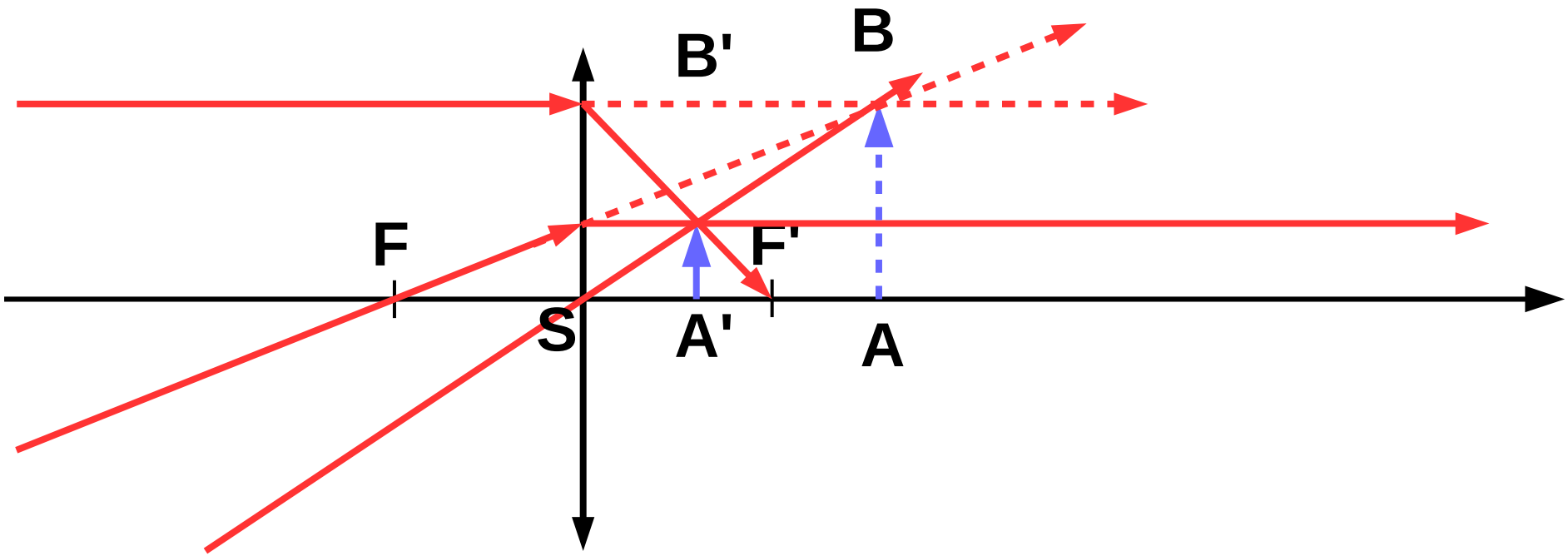
$$f f' = (p-f)(p'-f')$$

Même relation que pour le dioptre

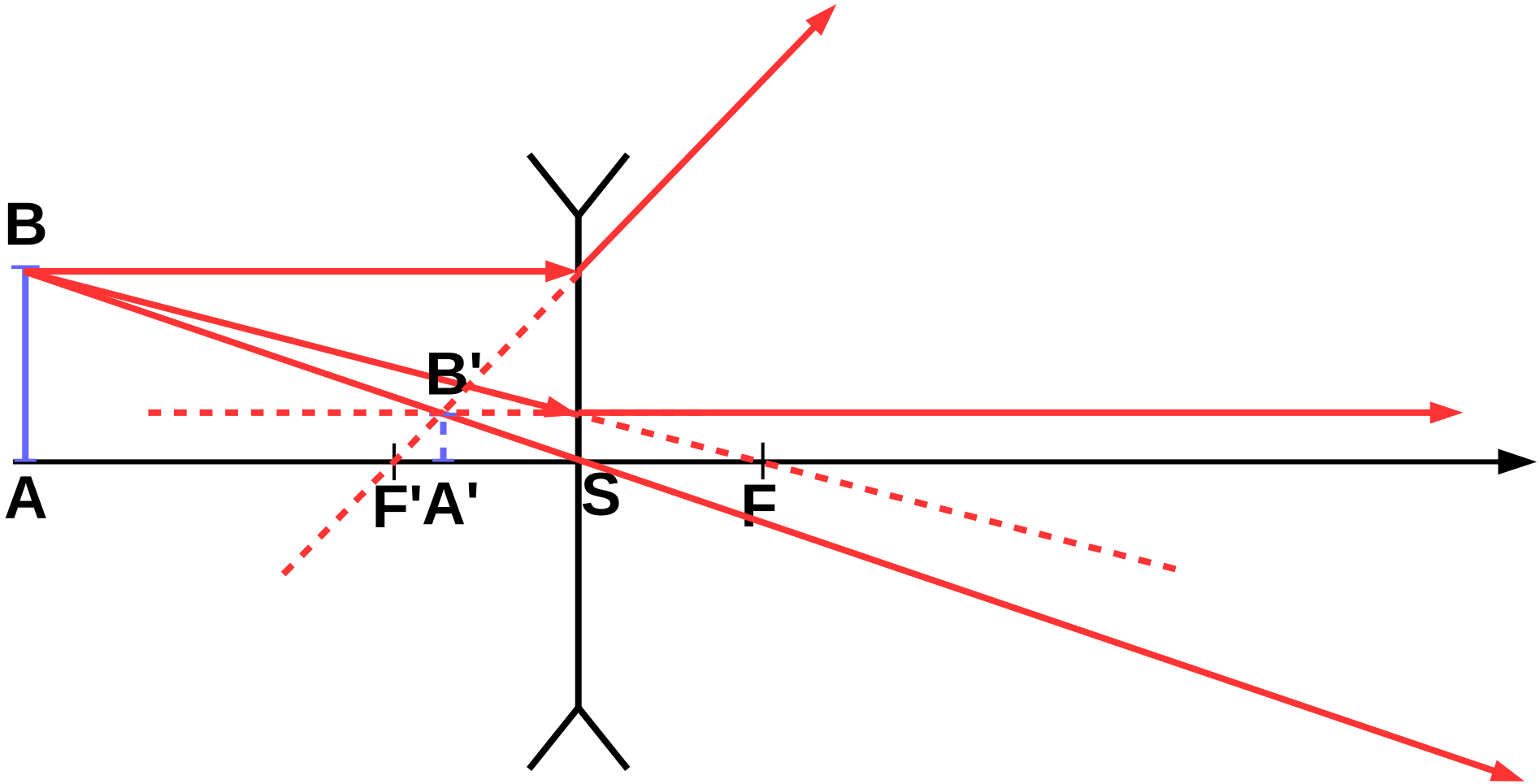
Lentille convergente – Objet réel



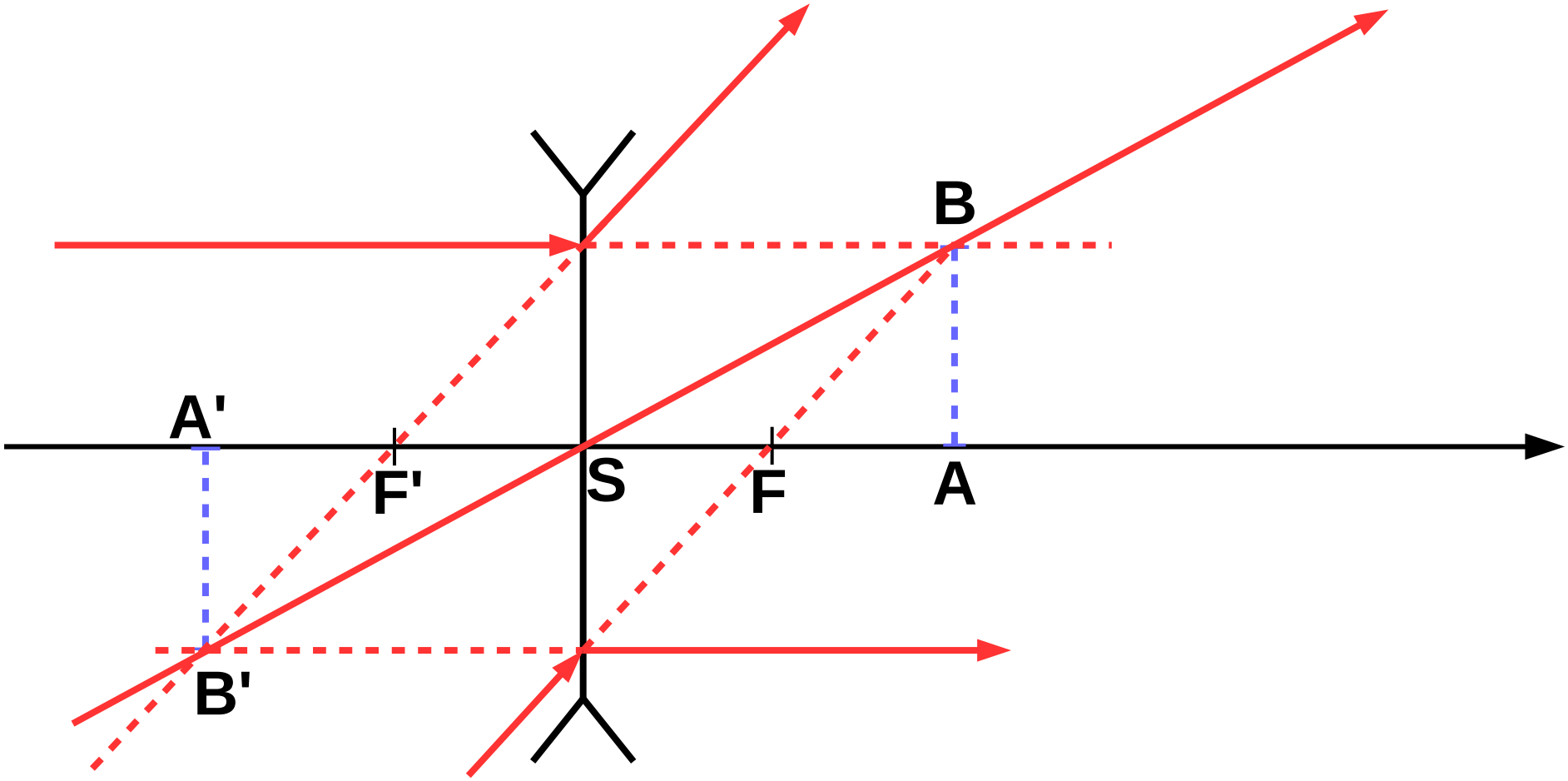
Lentille convergente – Objet virtuel



Lentille divergente – Objet réel



Lentille divergente – Objet virtuel



Plan focal