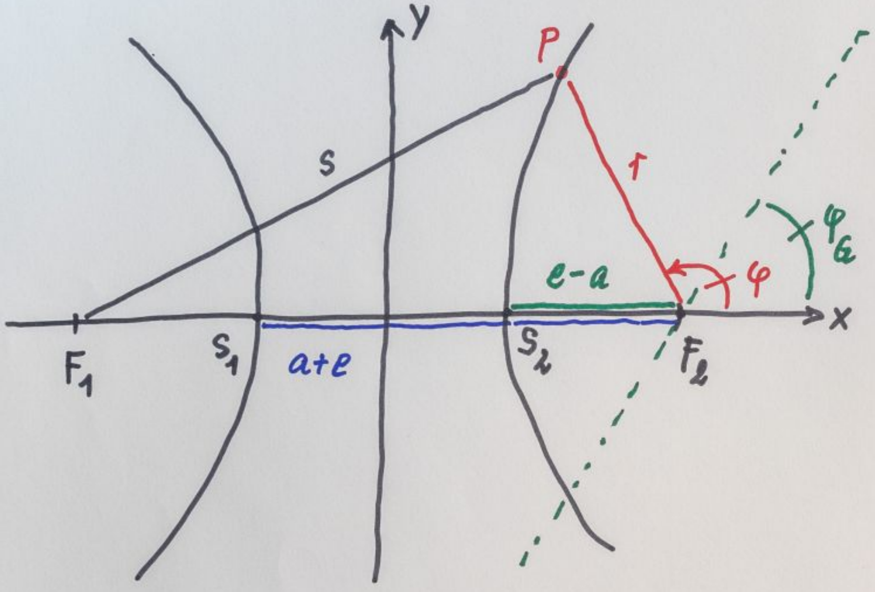
Polargleichung



numerische Exzentrizität $\varepsilon \equiv \frac{e}{a} > 1$

Hyperbel-Halbparameter $p = \frac{b^2}{a}$

Definition: $r - s = -2a \ , \ (r<s)$

$$s = r + 2a$$

$\Delta F_1 P F_2$, cos-Satz: $s^2 = r^2 + (2e)^2 - 4re\cos(\pi - \varphi)$

$$ra + a^2 = e^2 + re\cos\varphi$$

$$\underbrace{a^2 - e^2}_{-b^2} = -ra(1 - \varepsilon\cos\varphi)$$

$$r = \frac{p}{1 - \varepsilon\cos\varphi}$$

Diskussion: $\cos\varphi \leq 1$

$\varepsilon > 1$

$\rightarrow$ Grenzwinkel $\cos\varphi_G = \frac{1}{\varepsilon}$

kein endlicher Wert für r

- $\varphi = \pi$: $\cos\varphi = -1$, $\quad r = \frac{p}{1+\varepsilon} = \frac{b^2}{a\left(1+\frac{e}{a}\right)} = \frac{b^2}{a+e}$

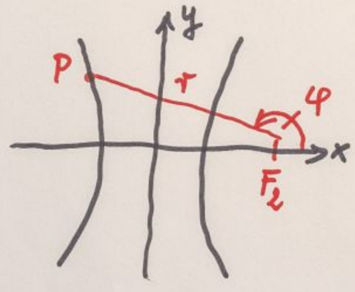
$$= \frac{b^2(a-e)}{(a+e)(a-e)} = \frac{b^2}{a^2-e^2}(a-e)$$

$$= -\frac{b^2}{b^2}(a-e) = e - a > 0 \ : S_2$$

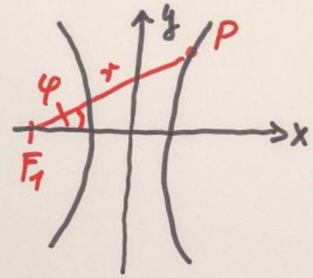
$r > 0$: $\cos\varphi < \frac{1}{\varepsilon}$, $\varphi_G < \varphi < 2\pi - \varphi_G$

- $\varphi = 0$: $\cos\varphi = 1$, $\quad r = -(a+e) < 0$, $|r| = a+e$: S_1

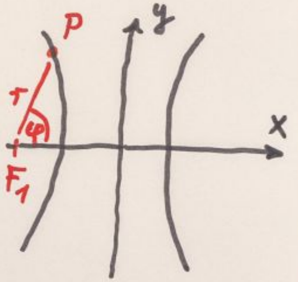
$r < 0$: $\cos\varphi > \frac{1}{\varepsilon}$, $-\varphi_G < \varphi < \varphi_G$



$$r = -\frac{p}{1+\varepsilon\cos\varphi}$$



$$r = -\frac{p}{1-\varepsilon\cos\varphi}$$



$$r = \frac{p}{1+\varepsilon\cos\varphi}$$