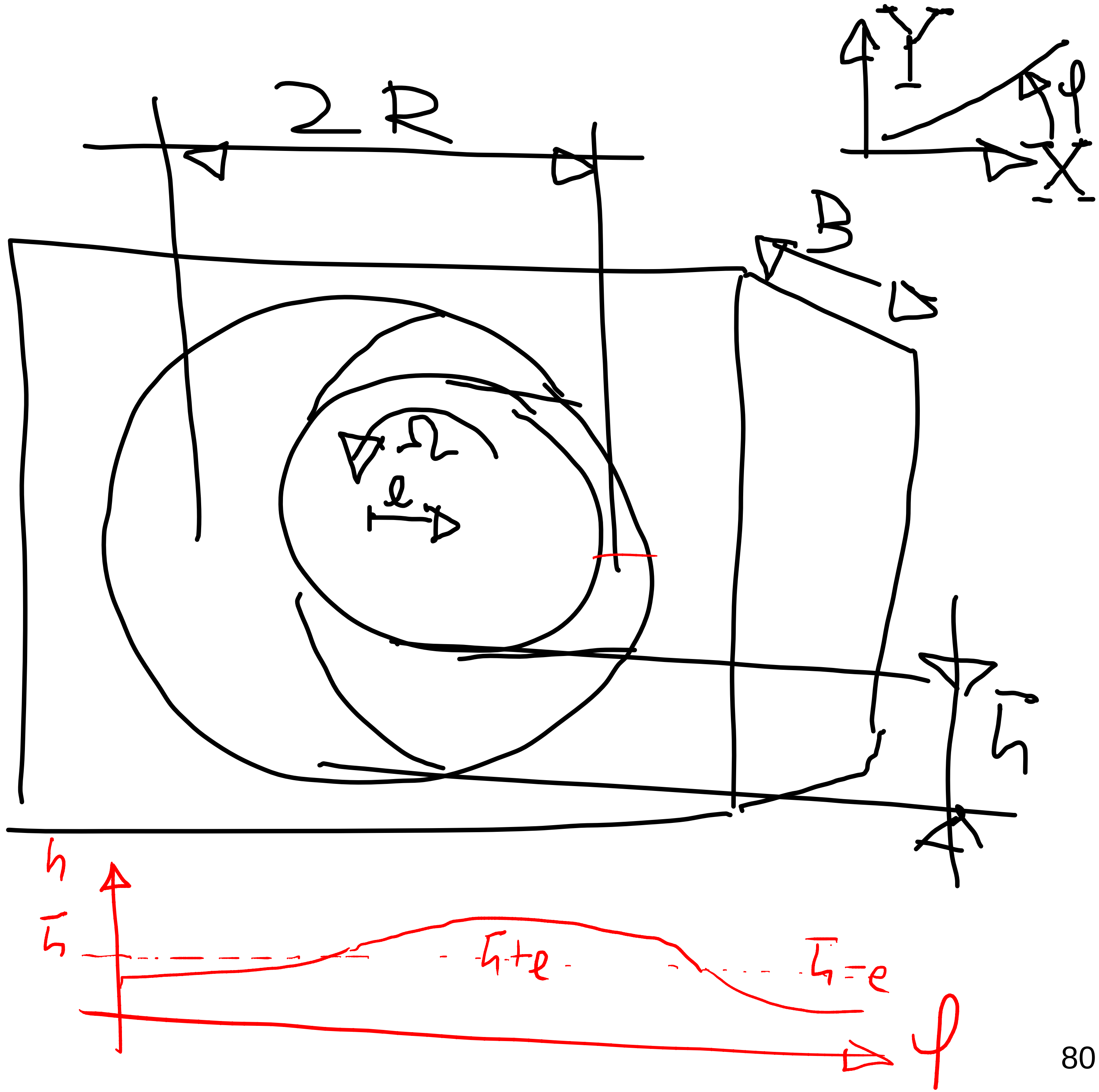

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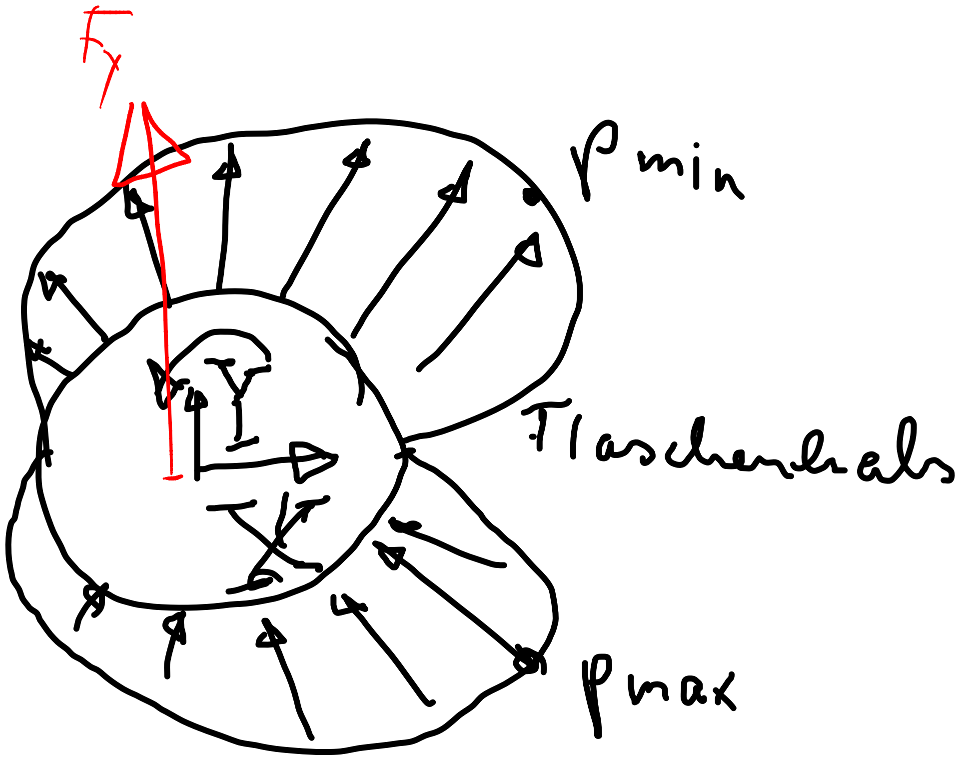

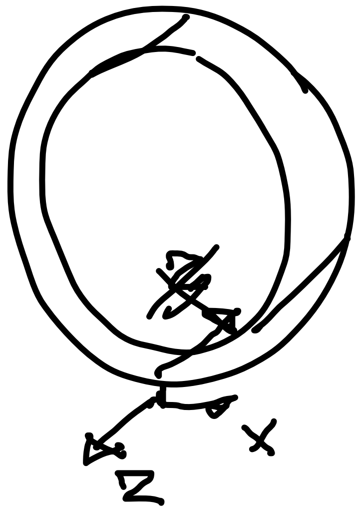

$$\vec{F} = \int -p \cdot \vec{n} \, dS = \int_0^B \int_0^{2\pi R} -p \vec{n} \, dx \, dz$$

$$= BR \int_0^{2\pi} \underbrace{-p \vec{e}_x \cos\varphi}_{\vec{e}_x \;\to\; 0} \underbrace{-p \vec{e}_y \sin\varphi \, d\varphi}_{F_y}$$

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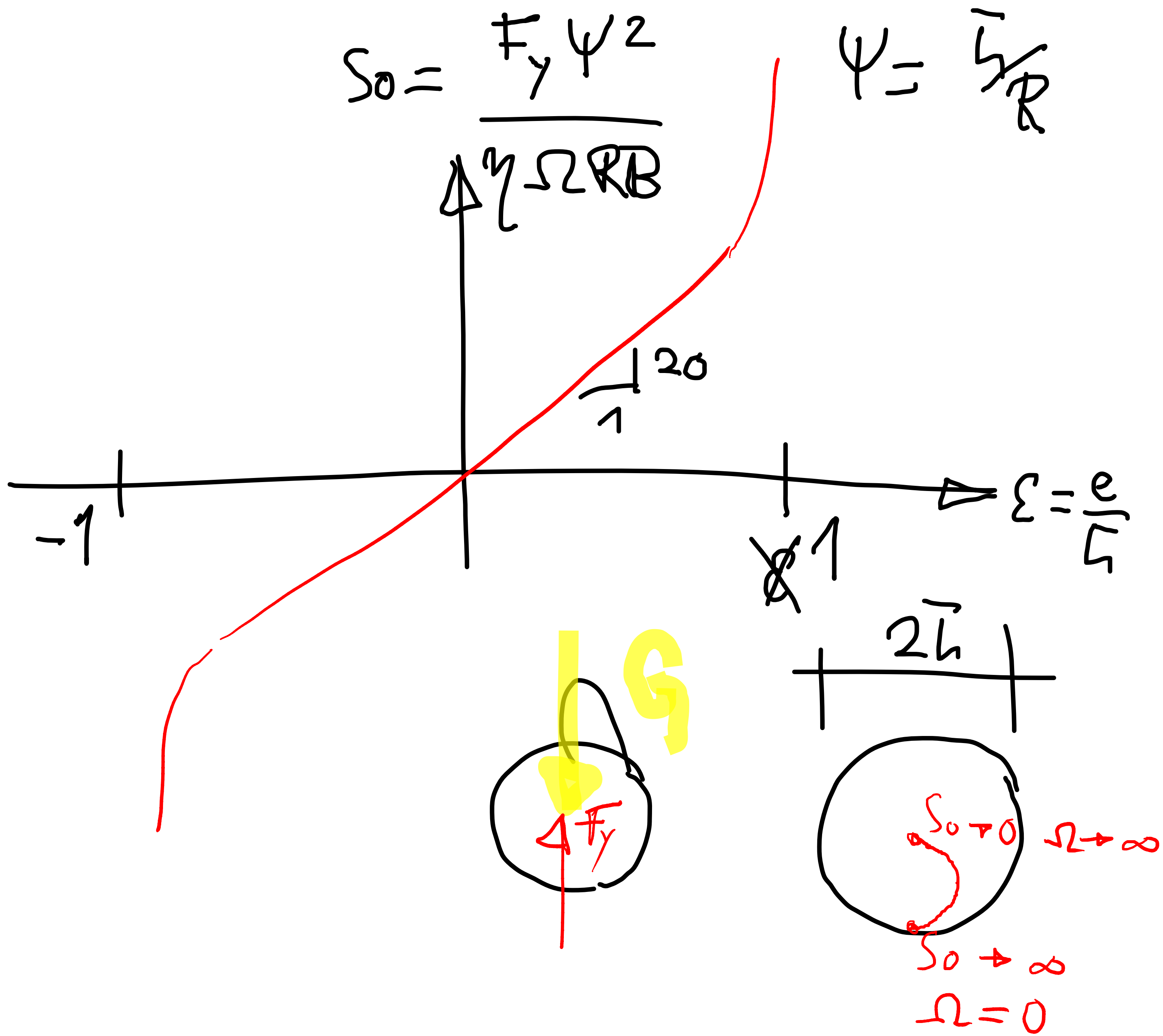

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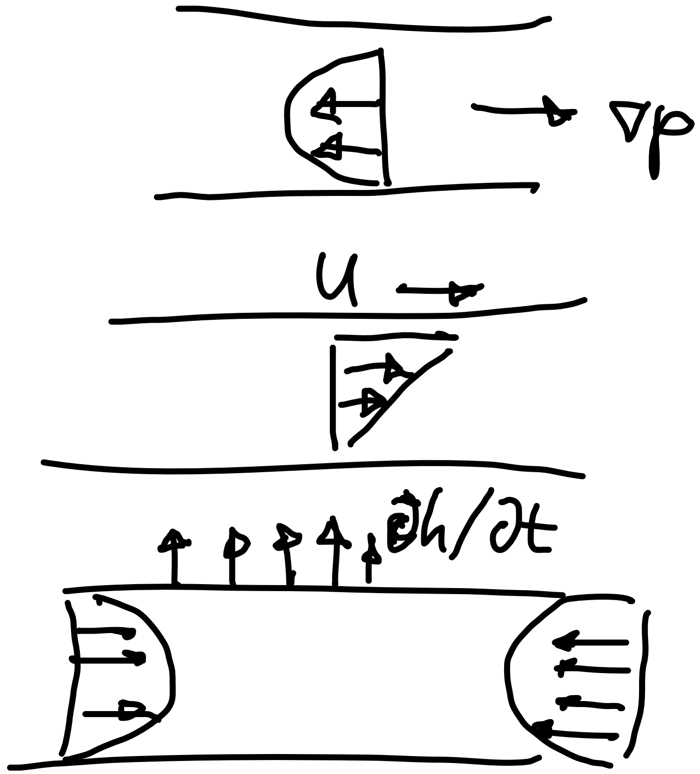
Reynoldsgleichung

$$\frac{\partial}{\partial x}\left(\frac{h^3}{\eta}\frac{\partial p}{\partial x}\right)+\frac{\partial}{\partial z}\left(\frac{h^3}{\eta}\frac{\partial p}{\partial z}\right)=6\frac{\partial}{\partial x}(Uh)+6\frac{\partial}{\partial z}(Wh)+12\frac{\partial h}{\partial t}$$



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$$\frac{\partial}{\partial x}\left(\frac{h^3}{\eta}\frac{\partial p}{\partial x}\right) = 6\frac{\partial}{\partial x}\left(hR\Omega\right)$$

$$x = R\,x^+$$

$$h = \bar{h}\,h^+$$

$$p = \frac{F_y}{RB}\,p^+$$

$$\frac{\bar{h}^3}{\eta}\frac{F_y}{RB}\frac{1}{R^2}\frac{\partial}{\partial x^+}\left(h^{+3}\frac{\partial p^+}{\partial x^+}\right) = \bar{h}\,\Omega\,\frac{R\,6}{R}\left(\frac{\partial}{\partial x^+}\left(h^+\right)\right)$$

$$\frac{\bar{h}^2 F_y}{\Omega\,\eta\,R^3 B}\frac{\partial}{\partial x^+}\left(h^{+3}\frac{\partial p^+}{\partial x^+}\right) = 6\frac{\partial}{\partial x^+}\left(h^+\right)$$

$$\overline{So} = \frac{F_y\,\psi^2}{\eta\,R B\,\Omega}$$

$$\psi = \bar{h}/R$$

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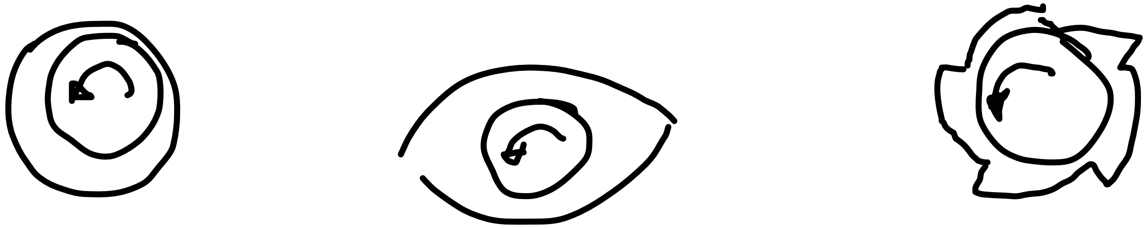
Kreislager Zitronenlager



$$\frac{F_y \psi^2}{\eta \Omega R} = fcn\left(\frac{e_x}{h}, \frac{e_y}{h}\right)$$

$$\left(\frac{e_x}{h}, \frac{e_y}{h}\right) = fcn\left(\frac{F_y \psi^2}{\eta \Omega R}\right)$$

So	ε_x	ε_y	$\lvert\varepsilon\rvert$	φ

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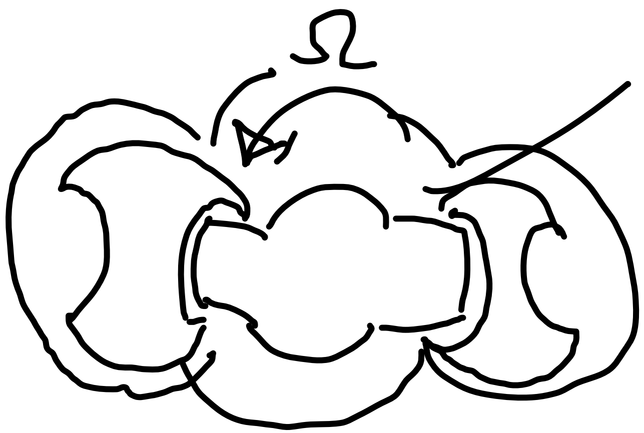
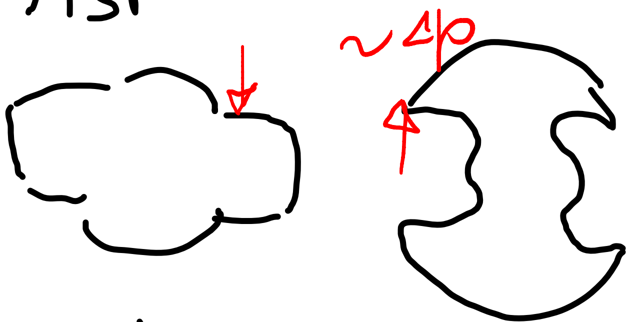
Schraubenspindelpumpe



Antriebsspindel ASP

LSP Laufspindel



$$Q \approx V_s\, n$$

$$P = M \cdot \underbrace{n \cdot 2\pi}_{\Omega}$$

$$P = \Delta p \cdot Q$$

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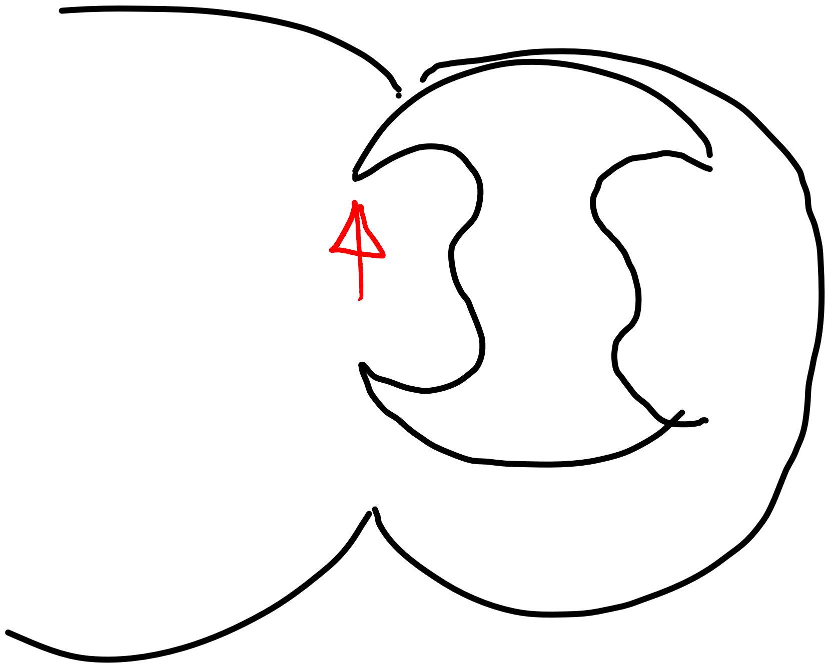

Anlaufen der Laufspindel:
Gleitlagereffekt ist nicht mehr in der Lage die Druckkräfte auszugleichen.

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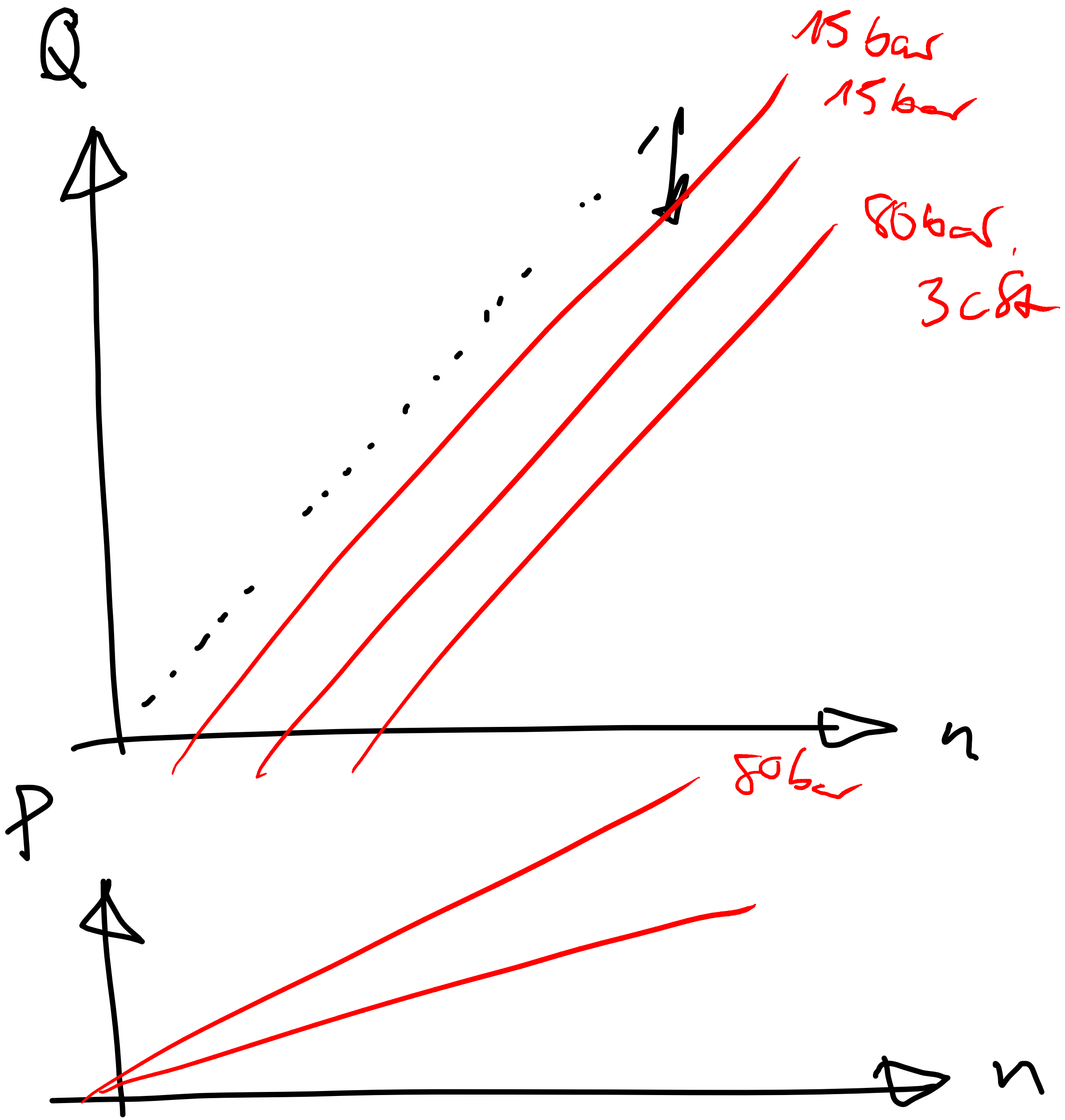

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