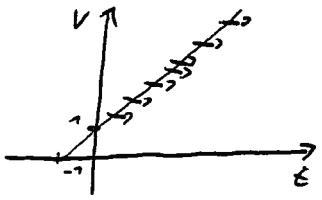
Tafelmitschrift 7

$$\frac{dV}{dt} = 1 + t - V$$

Interessante Steigungen

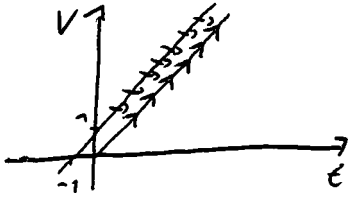
$$\frac{dV}{dt} = 0 = 1 + t - V$$

$$V = 1 + t$$



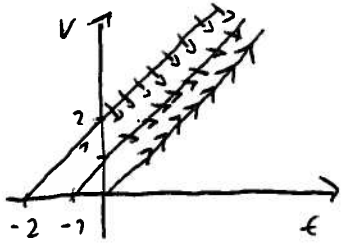
$$\frac{dV}{dt} = 1 = 1 + t - V$$

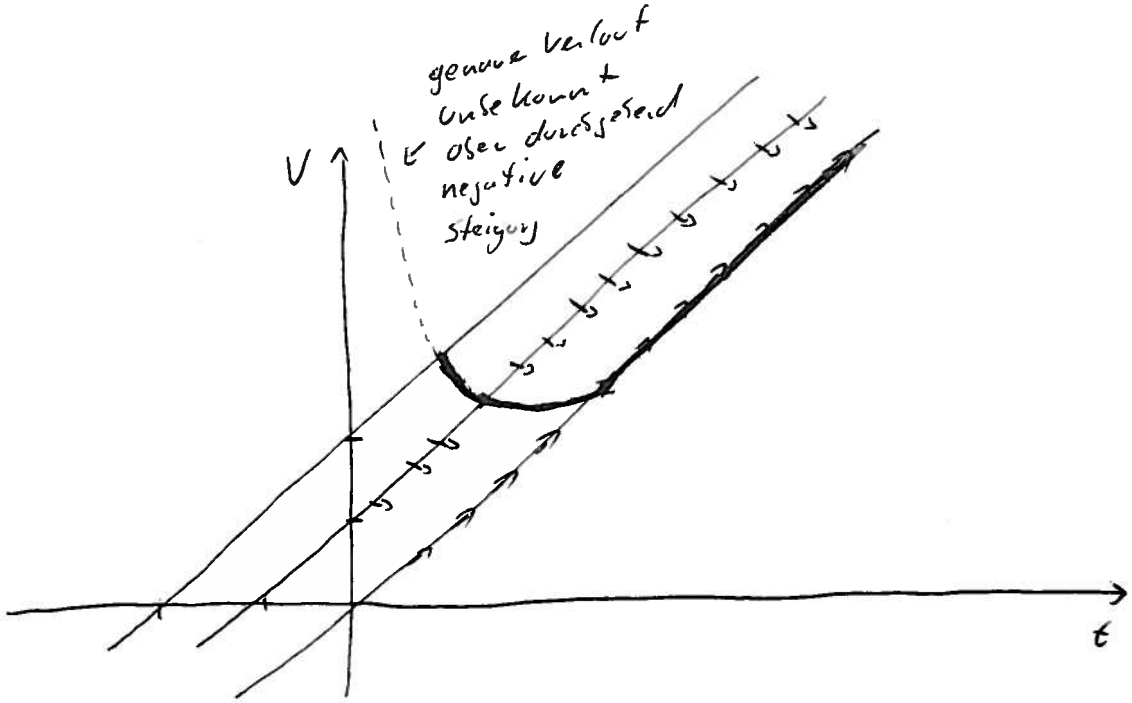
$$V = t$$



$$\frac{dV}{dt} = -1 = 1 + t - V$$

$$V = 2 + t$$



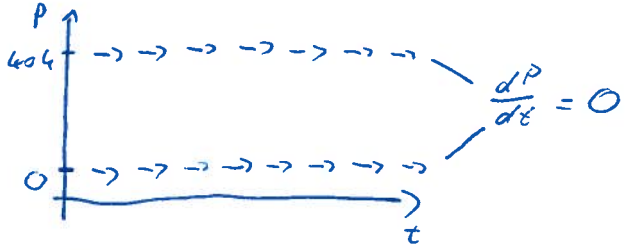


- Fische in Teich mit Population P und Wachstumsrate $0.25\,\frac{1}{a}$

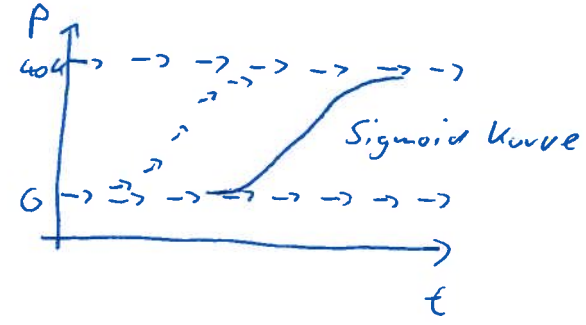
$$\frac{dP}{dt} = 0.25\,\frac{1}{a} \cdot P \quad \text{(exp. Wachstum)}$$

- Max. Population $40 \cdot 10^3 = 40k$ Fische

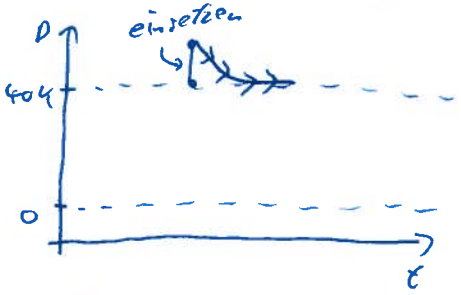
$$\frac{dP}{dt} = 0.25\,\frac{1}{a} \cdot P \left(1 - \frac{P}{40k}\right)$$



- $\frac{dP}{dt} = \underbrace{0.25\,\frac{1}{a} \cdot P}_{P\uparrow:\ \uparrow} \cdot \underbrace{\left(1 - \frac{P}{40k}\right)}_{P \to 40k,\ \to 0}$



- Fische werden eingesetzt



$$\frac{dP}{dt} = 0.25\,\frac{1}{a} \cdot \underbrace{P\left(1 - \frac{P}{40k}\right)}_{<0 \text{ für } P>40k}$$

- Fische sollen mit einer Rate R gefangen werden $[R] = \frac{1}{a}$

$$\frac{dP}{dt} = 0.25\,\frac{1}{a} \cdot P \cdot \left(1 - \frac{P}{40k}\right) - R$$

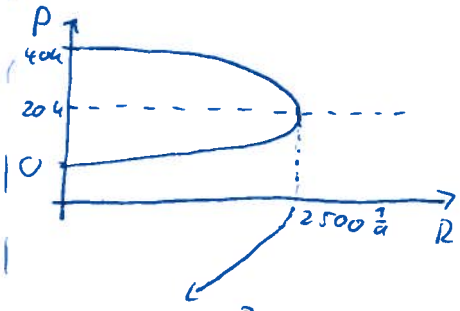
- Mit welcher Rate R darf ich Fische fangen ohne sie auszurotten

$$0 = 0.25\,\frac{1}{a} \cdot P\left(1 - \frac{P}{40k}\right) - R$$

$$0 = \frac{0.25\,\frac{1}{a}}{40k} \cdot P^2 - 0.25\,\frac{1}{a} \cdot P + R$$

$$P_{1/2} = \frac{0.25\,\frac{1}{a} \pm \sqrt{\left(0.25\,\frac{1}{a}\right)^2 - 4\,\frac{0.25\,\frac{1}{a}}{40k} \cdot R}}{2 \cdot \frac{0.25\,\frac{1}{a}}{40k}}$$

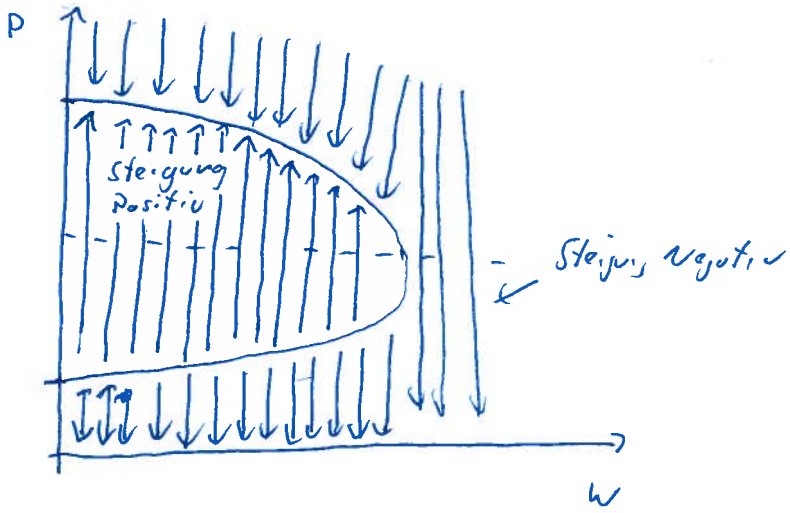
$$P_{1/2} = 20k \pm 40k\sqrt{\frac{1}{4} - \frac{R}{0.25\,\frac{1}{a} \cdot 40k}}$$

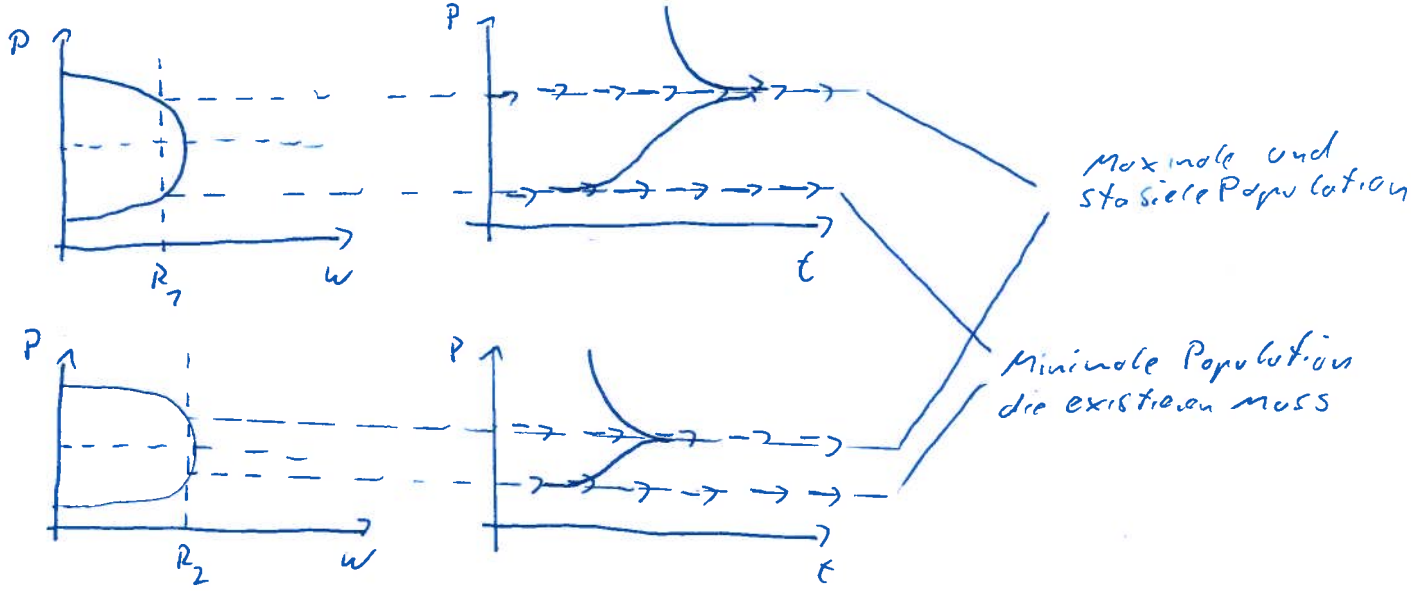


$$0 = \frac{1}{4} - \frac{R}{0.25\,\frac{1}{a} \cdot 40k}$$

$$R = 2500\,\frac{1}{a}$$

Tafelmitschrift 2.2





Maximale Rate 2500 $\frac{1}{a}$ → es existieren immer nur 20.000 Risse