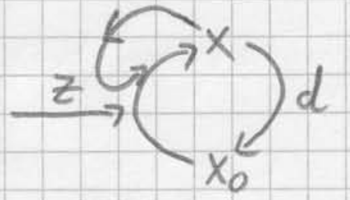
Max-Zyklus



$$\dot{x} = \overbrace{(x_g - x)}^{x_0} \cdot x \cdot z - dx$$

$$z = \bar{z} + \sigma \Omega(t)$$

$$\langle \Omega \Omega \rangle = \delta(\tau)$$

$$x \in [0, x_g]$$

$$\dot{x} = \underbrace{\left[(x_g - x) \cdot x \cdot \bar{z} - d x\right]}_{f(x)} + \underbrace{\left[(x_g - x) x \sigma\right]}_{g(x)} \Omega(t)$$

$$g^2 = \sigma^2 x^2 (x_g - x)^2$$

$$\frac{d}{dx} g^2 = 2\sigma^2 x (x_g - x)^2 + \sigma^2 x^2 \, 2 (x_g - x)(-1) =$$

$$= 2\sigma^2 x (x_g - x) \left[\underbrace{(x_g - x) - x}_{(x_g - 2x)}\right] = 2\sigma^2 x (x_g - x)(x_g - 2x)$$

$? \longrightarrow \varepsilon = +/-1$

$$A(x) = f(x) + \frac{\varepsilon}{4} \frac{d}{dx} g^2(x) =$$

$$A(x) = \bar{z} x (x_g - x) - dx + \frac{\varepsilon \sigma^2}{2} x (x_g - x)(x_g - 2x) \qquad \text{(3. Ordn.)}$$

$$B(x) = \frac{1}{2} g^2(x) = \frac{\sigma^2}{2} x^2 (x_g - x)^2 \qquad \text{(4. Ordn.)}$$

$$I(x) = \int_{x_{min}}^{x} \frac{A(s)}{B(s)} ds \qquad P(x) = \frac{N}{B(x)} \exp[I(x)]$$

Besonders relevant: $P(x \to 0)$

brauche $B(x \to 0)$, $I(x \to 0)$

brauche $\left.\frac{A(s)}{B(s)}\right|_{s \to 0}$

$$A(x) = \bar{z}\,x_g x - \bar{z}\,x^2 - dx + \frac{\varepsilon\sigma^2}{2}\underbrace{\left[(x_g x - x^2)(x_g - 2x)\right]}_{\left[x_g^2 x - 2x_g x^2 - x_g x^2 + 2x^3\right]}$$

$$A(x\to 0) \to \bar{z}\,x_g x - dx + \frac{\varepsilon\sigma^2}{2}x_g^2 x = \left(\bar{z}\,x_g - d + \frac{\varepsilon\sigma^2}{2}x_g^2\right)\cdot x =: \alpha x$$

$$B(x) = \frac{\sigma^2}{2}\left[x^2(x_g^2 - 2x_g x + x^2)\right] = \frac{\sigma^2}{2}\left[x_g^2 x^2 - 2x_g x^3 + x^4\right]$$

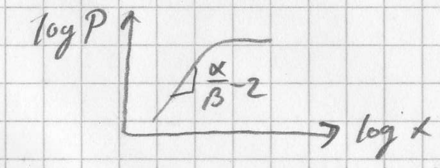
$$B(x\to 0) \to \left(\frac{\sigma^2 x_g^2}{2}\right)x^2 =: \beta x^2$$

$$\left.\frac{A(s)}{B(s)}\right|_{s\to 0} \to \frac{\alpha s}{\beta s^2} = \frac{\alpha}{\beta}\cdot s^{-1} \Rightarrow I(x\to 0) \to \frac{\alpha}{\beta}\int_{x_{min}}^{x} s^{-1}\,ds = \frac{\alpha}{\beta}\left[\ln(s)\right]_{x_{min}}^{x} = \frac{\alpha}{\beta}\left[\ln(x) - \ln(x_{min})\right] = \frac{\alpha}{\beta}\ln(x/x_{min})$$

$$\Rightarrow \boxed{P(x\to 0) = \frac{N}{\beta x^2}\cdot \exp\left[\frac{\alpha}{\beta}\ln(x/x_{min})\right]} = \frac{N}{\beta}x^{-2}\cdot(x/x_{min})^{\alpha/\beta} =$$

$$= \left(\frac{N x_{min}^{-2}}{\beta}\right)(x/x_{min})^{-2}(x/x_{min})^{\alpha/\beta} = \boxed{\left(\frac{N x_{min}^{-2}}{\beta}\right)(x/x_{min})^{(\alpha/\beta)-2}}$$

Man würde doch einen positiven Exponenten erwarten ?



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$$\frac{\alpha}{\beta} = \frac{\bar{z}x_g - d + \frac{\varepsilon\sigma^2}{2}x_g^2}{\frac{\sigma^2 x_g^2}{2}} =$$

$$\frac{\alpha}{\beta} = \frac{2(\bar{z}x_g - d)}{\sigma^2 x_g^2} + \varepsilon$$

ist vermutlich -1

$$\frac{\alpha}{\beta} > 2 \iff \frac{2(\bar{z}x_g - d)}{\sigma^2 x_g^2} > 3$$

$$\iff \frac{(\bar{z}x_g - d)}{\sigma^2 x_g^2} > \frac{3}{2}$$

Somit: $\bar{z}x_g > d$ (Rückreaktion nicht zu stark)

σ^2 klein genug (ähnlichen Effekt hat kleine korrel. Zeit τ_c)