

Schwingungen

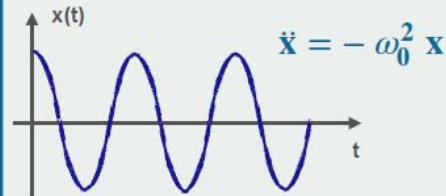
Grundlagen

Beispiele

Formalismus

Harmonische Schwingungen

Freie Schwingung

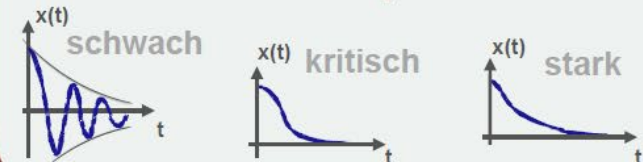


$x(t) = A \cos(\omega_0 t) + B \sin(\omega_0 t)$
 $v(t) = \dot{x} = -\omega_0 A \sin(\omega_0 t) + \omega_0 B \cos(\omega_0 t)$

- Rückstellkraft \sim Auslenkung
- $x(t)$ ist cos- bzw. sin- Funktion

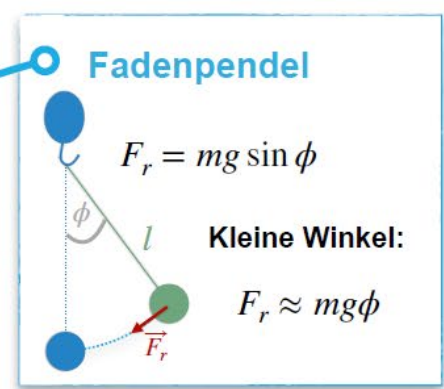
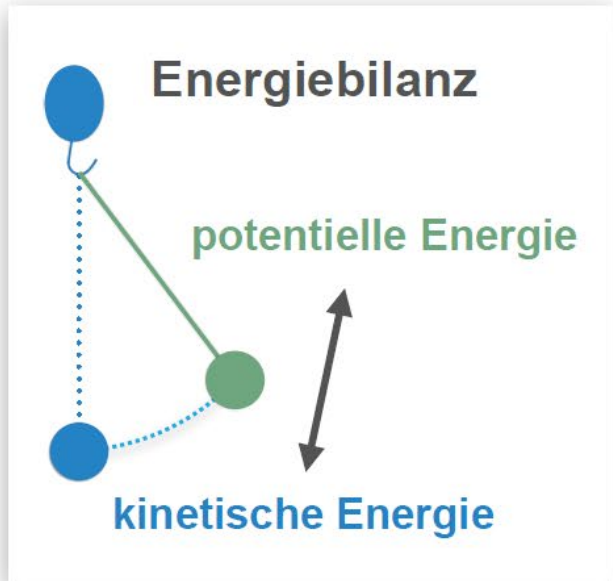
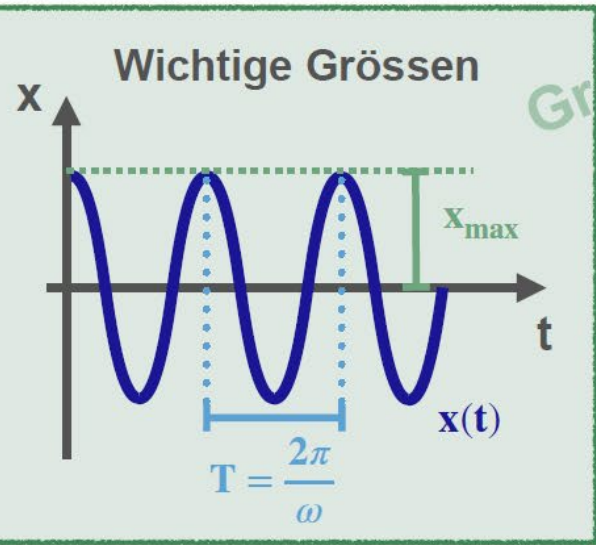
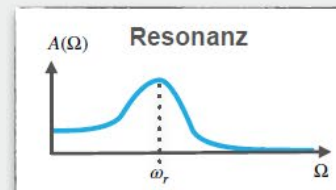
$$\ddot{x} + 2\beta\dot{x} + \omega_0^2 x = F_{ext}(t)$$

Mit Dämpfung $\beta > 0$

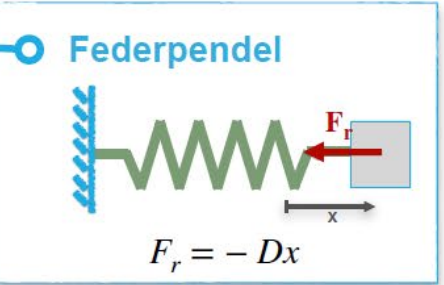


Mit Antrieb $F_{ext}(t) = A_0 \cos(\Omega t)$

Pendel übernimmt die Anregungsfrequenz



$$\ddot{\phi} = -\frac{g}{l} \phi$$



$$\ddot{x} = -\frac{D}{m} x$$

