

Gedempte trillingen

<i>tg</i> F_w	
<p>Amplitudevermindering</p> <p>→ De grafiek bevindt zich tussen 2 rechten</p>	$A_{n+2} - A_n = \frac{4F_w}{k}$ $rico = \pm \frac{2F_w \omega_0}{\pi k}$
Visceuze demping	
<p>Differentiaalvergelijking $m\ddot{u} + b\dot{u} + ku = 0$</p> <p>⇒ $u = D.e^{rt}$</p> <p>⇒ $D.e^{rt}(mr^2 + br + k) = 0$</p> <p>⇒ $r_{1,2} = -\frac{b}{2m} \pm \sqrt{\frac{b^2}{4m^2} - \omega_0^2}$</p>	
<p>1. Geringe demping: $\frac{b^2}{4m^2} < \omega_0^2$</p>	$u(t) = A_0 e^{\frac{-b}{2m}t} \sin(\omega_1 t + \varphi)$ $\rightarrow \omega_1^2 = \omega_0^2 - \frac{b^2}{4m^2}$
<p>2. Kritische demping: $\frac{b^2}{4m^2} = \omega_0^2$</p>	$u = (A + Bt)e^{\frac{-b}{2m}t}$ <p>*energie/tijd-verband</p> $\frac{d(E_{mech})}{dt} = - F_w v $
<p>3. Grote demping: $\frac{b^2}{4m^2} > \omega_0^2$</p>	$U = A.e^{\left(-\frac{b}{2m} \pm \sqrt{\frac{b^2}{4m^2} - \omega_0^2}\right)t} + B.e^{\left(-\frac{b}{2m} \pm \sqrt{\frac{b^2}{4m^2} - \omega_0^2}\right)t}$