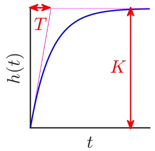
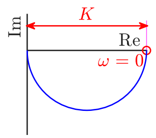
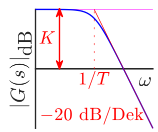
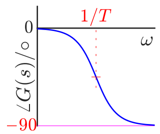
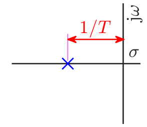
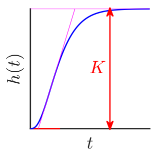
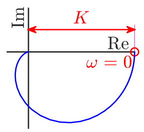
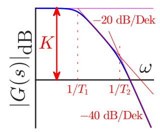
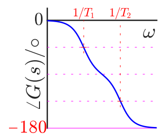
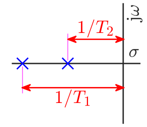
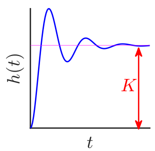
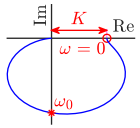
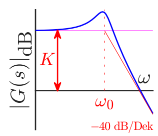
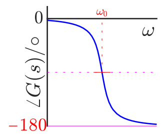
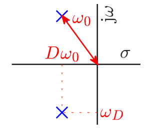
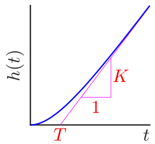
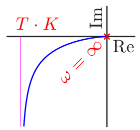
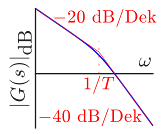
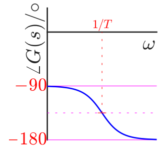
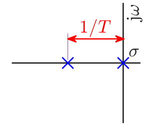
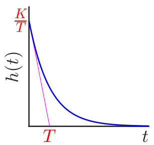
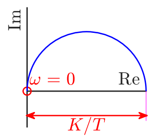
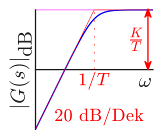
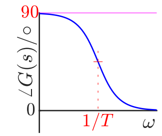
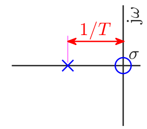
Offizielles Hilfsblatt für die Klausur Regelungstechnik 1, Seite 1/2

Prof. Dr.-Ing. Jens Geisler, Hochschule Flensburg, Stand: 17. April 2025

	Differenzialgleichung	Übertragungsfunktion $G(s)$	Übergangsfunktion $h(t)$	Ortskurve $G(\mathrm{j}\omega)$	Bode-Amplitudengang	Bode-Phasengang	Pol-Nullstellen-Diagramm
PT1	$T\dot{x}_a(t) + x_a(t) = K \cdot x_e(t)$	$\frac{K}{Ts+1}$					
PT2	$T_1T_2\ddot{x}_a(t) + (T_1+T_2)\dot{x}_a(t) + x_a(t)$ $= K \cdot x_e(t)$ (aus 2 PT1-Gliedern)	$\frac{K}{(T_1s+1)(T_2s+1)}$					
PT2	$\omega_0^{-2}\ddot{x}_a(t) + 2D\omega_0^{-1}\dot{x}_a(t) + x_a(t)$ $= K \cdot x_e(t)$ (schwingfähig)	$\frac{K}{\frac{1}{\omega_0^2}s^2 + \frac{2D}{\omega_0}s + 1}$					
IT1	$T\ddot{x}_a(t) + \dot{x}_a(t) = K \cdot x_e(t)$	$\frac{K}{s(Ts+1)}$					
DT1	$T\dot{x}_a(t) + x_a(t) = K \cdot \dot{x}_e(t)$	$\frac{K \cdot s}{Ts+1}$					

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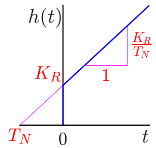
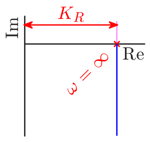
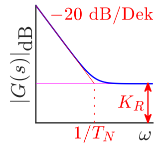
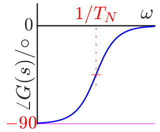
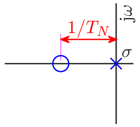
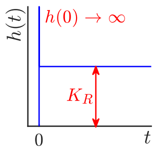
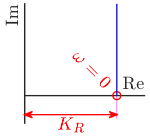
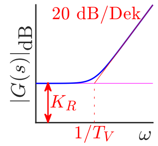
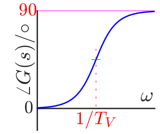
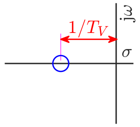
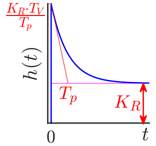
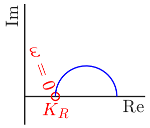
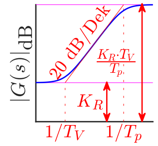
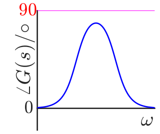
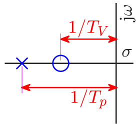
PI	$y(t) = K_R\left(e(t) + \frac{1}{T_N}\int e(t)\,\mathrm{d}\tau\right)$	$K_R\frac{T_N s+1}{T_N s}$					
PD	$x_a(t) = K_R\left(e(t) + T_V\frac{\mathrm{d}}{\mathrm{d}t}e(t)\right)$	$K_R\,(T_V s + 1)$					
PDT1	$T_p\dot{x}_a(t) + x_a(t)$ $= K_R\left(e(t) + T_V\dfrac{\mathrm{d}}{\mathrm{d}t}e(t)\right)$	$K_R\frac{T_V s+1}{T_p s+1}$					
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