Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Prof. Dr. Eleni Chatzi, Strukturmechanik & Monitoring
Institut für Baustatik und Konstruktion, D-BAUG

Tabelle I

Festeinspannmomente für beidseitig eingespannte Stäbe

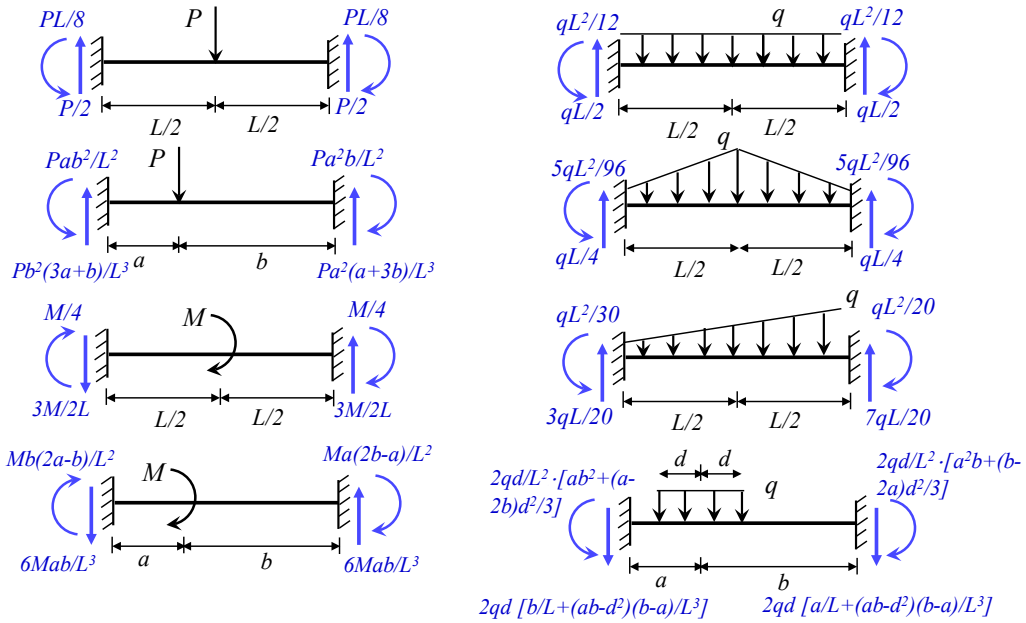

Tabelle II

Festeinspannmomente für einseitig eingespannte Stäbe

***Querkräfte folgen aus Gleichgewicht**

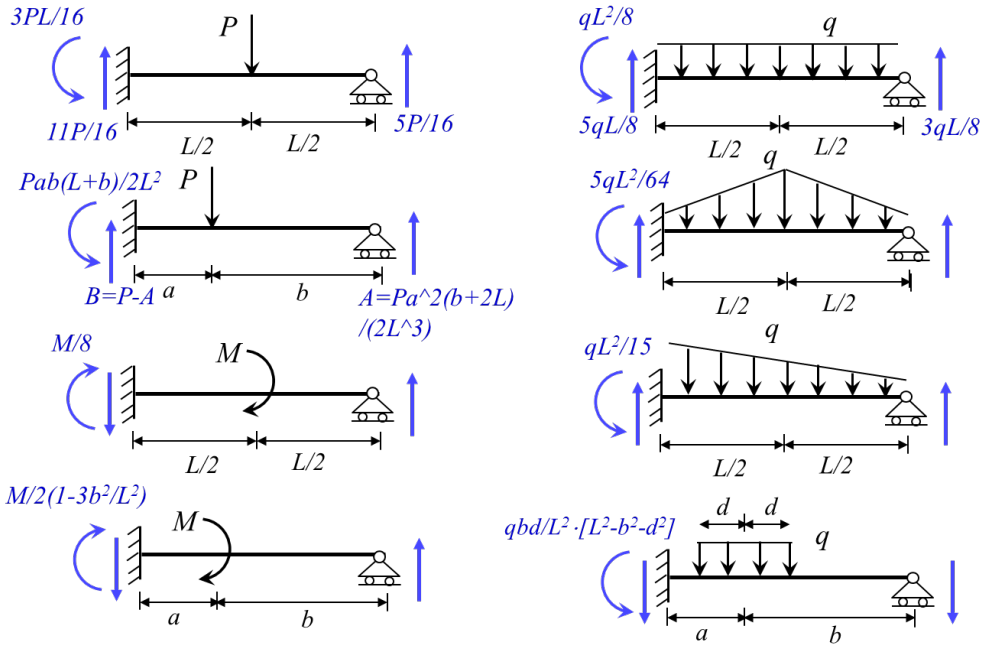

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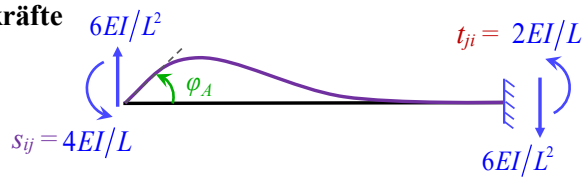
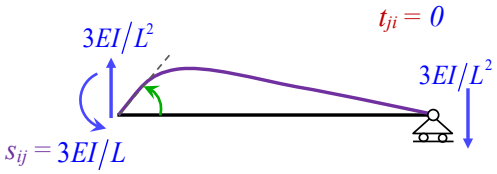
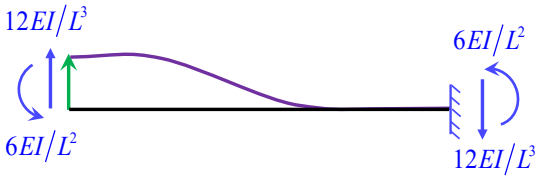
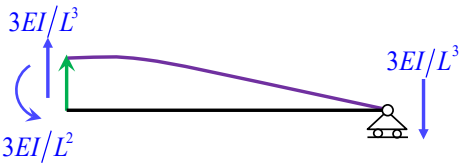
Tabelle III

Stabendmomente/Querkräfte infolge Verformungen

s_{ij} : Stabsteifigkeit
t_{ij} : Kreuzsteifigkeit

Beidseitig eingespannt	Einseitig eingespannt
	
	

Tabele IV – Drehwinkelverfahren (Definitionen)

Steifigkeit	BEB	EEB	EEB	
Stab-	$s_{ij} = s_{ji} = \frac{4EI}{L}$	$s_{ij} = \frac{3EI}{L}, s_{ji} = 0$	$s_{ji} = \frac{3EI}{L}, s_{ij} = 0$	
Kreuz-	$t_{ij} = t_{ji} = \frac{2EI}{L}$	$t_{ji} = t_{ij} = 0$	$t_{ij} = t_{ji} = 0$	
Verschiebe-	$v_{ij} = v_{ji} = -\frac{6EI}{L}$	$v_{ij} = -\frac{3EI}{L}$	$v_{ji} = -\frac{3EI}{L}$	$v_{ij} = -(s_{ij} + t_{ij})$

$$M_{ij} = M_{ij}^0 + s_{ij}\varphi_i + t_{ij}\varphi_j \underbrace{-(s_{ij} + t_{ij})}_{v_{ij}}\psi_{ij}$$

M_{ij}^0	Festeinspannmoment
s_{ij}	Stabsteifigkeit
t_{ij}	Kreuzsteifigkeit
φ_i, φ_j	Knotendrehwinkel
ψ_{ij}	Stabdrehwinkel

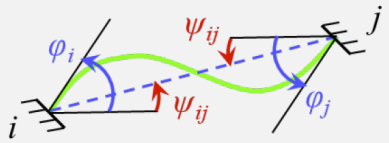


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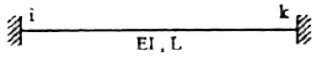
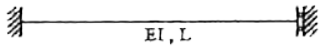
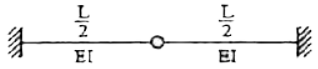
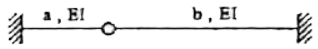
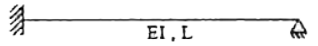
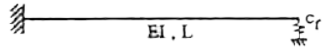
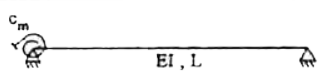
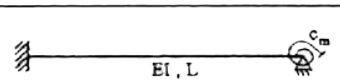
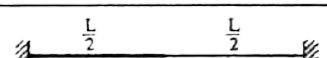
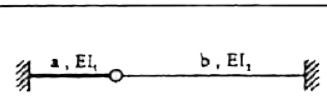
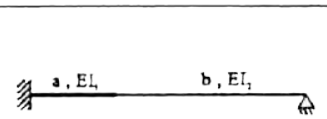
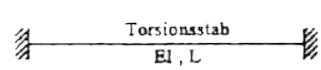
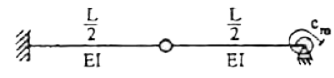
Tabelle V – Drehwinkelverfahren Stab/Kreuzsteifigkeiten

	S_{ik}	S_{ki}	$t_{ik} = t_{ki}$
	$\frac{4EI}{L}$	$\frac{4EI}{L}$	$\frac{2EI}{L}$
	$\frac{EI}{L}$	$\frac{EI}{L}$	$-\frac{EI}{L}$
	$\frac{3EI}{L}$	$\frac{3EI}{L}$	$\frac{3EI}{L}$
	$\frac{3EI}{a\left[1+\left(\frac{b}{a}\right)^3\right]}$	$\frac{3EI \cdot b^2}{a^3\left[1+\left(\frac{b}{a}\right)^3\right]}$	$\frac{3EI \cdot b}{a^2\left[1+\left(\frac{b}{a}\right)^3\right]}$
	0	0	0
	$\frac{3EI}{L}$	0	0
	$\frac{1}{\left(\frac{L}{3EI}\right)+\left(\frac{c_f}{L^2}\right)}$	0	0
	$\frac{1}{\left(\frac{L}{3EI}\right)+c_m}$	0	0
	$\frac{4EI \cdot [L+3EI \cdot c_m]}{L \cdot [L+4EI \cdot c_m]}$	$\frac{1}{\left(\frac{L}{4EI}\right)+c_m}$	$\frac{1}{\left(\frac{L}{2EI}\right)+2c_m}$
	$\frac{80EI}{11L}$	$\frac{48EI}{11L}$	$\frac{32EI}{11L}$
	$\frac{3}{\left(\frac{a}{EI_1}\right)+\left(\frac{b^3}{a^2 EI_2}\right)}$	$\frac{3}{\frac{a^3}{b^2 EI_1}+\frac{b}{EI_2}}$	$\frac{3 \cdot b}{\left(\frac{a^2}{EI_1}\right)+\left(\frac{b^3}{aEI_2}\right)}$
	$\frac{1}{\frac{a\left(1+\frac{b}{L}+\frac{b^2}{L^2}\right)}{3EI_1}+\frac{\frac{b^3}{L^2}}{3EI_2}}$	0	0
	$\frac{GK}{L}$	$\frac{GK}{L}$	$-\frac{GK}{L}$
	$\frac{3EI}{L+3EI \cdot c_m}$	$\frac{3EI}{L+3EI \cdot c_m}$	$\frac{3EI}{L+3EI \cdot c_m}$

Source: Prof. Thomas Vogel (DBAUG, ETHZ) – FS2001