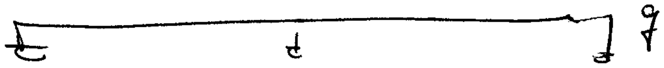
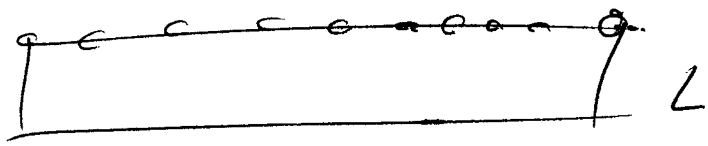


$n = 10$

$N = 2 \cdot n = 20$

geg.: L, n, $E(x)$, $J(x)$, $q(x)$



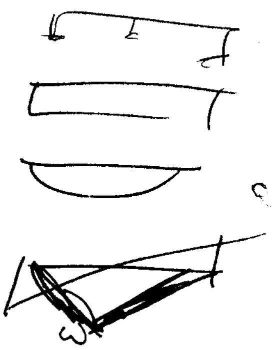
$i \mapsto$

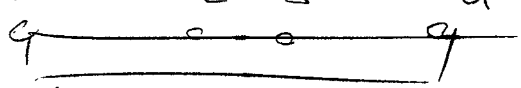
20×20

$S = [\ ]$

$L = 40$ m

$h = 10$ m





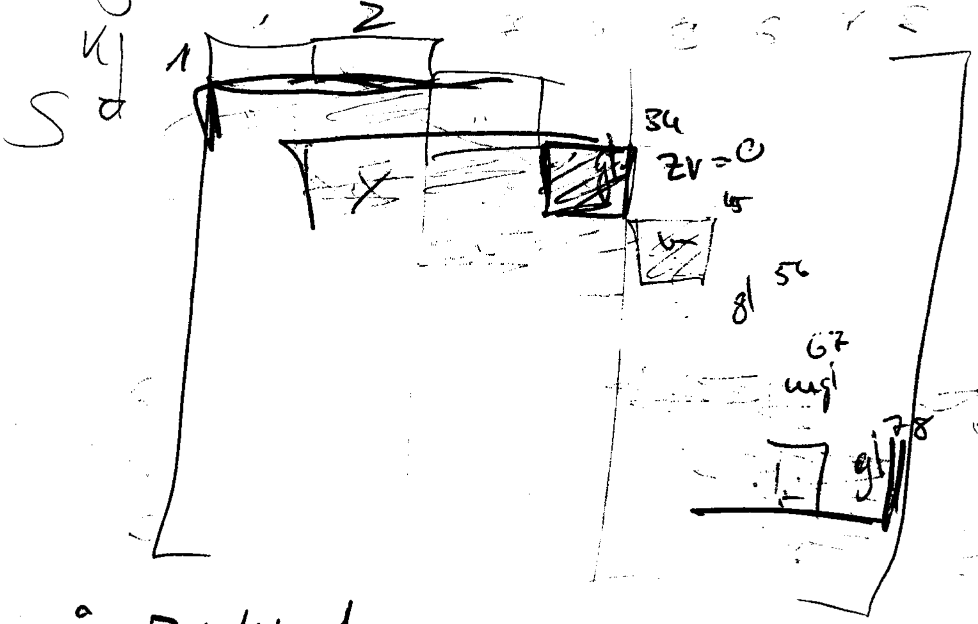
$w'''' = M$ 4. Grad

$w''' = Q$ 2. Grad

$w'' = q$ 1. Grad

$\frac{3+1}{2} = 4$

$\frac{4+1}{2}$



x_2 x_4

$\varphi_1 \cdot \varphi_2$

$i = 2$

$\mapsto i$

$j: 3 : 1 : n-1$

$k: j-1 : 1 : j+1$

$j-1 \dots j+1$

$1 \dots j+1$

j	k
1	1
1	2
2	1
2	2
2	3
3	2
3	3
3	4

	j	k
φ^2		
φ^0	$n-1$	$n-1$
$\varphi_n (n,j)$	$n-1$	n
φ^2	n	$n-1$
φ^0	n	n

Matrix mit drei Diagonalen

Hauptdiagonale

$\phi_1 \cdot \phi_1$

$$\left(h\bar{\Phi}_4\left(\frac{x-x_{i-1}}{h}\right)\right)' = h\cdot\bar{\Phi}_4'\left(\frac{x-x_{i-1}}{h}\right)$$

$$= \left(\bar{\Phi}_4\right)'$$

$$= \frac{1}{h}\left(\bar{\Phi}_4''\left(\frac{x-x_{i-1}}{h}\right)\right)$$

$$\left(h\left(\bar{\Phi}_2\left(\frac{x-x_i}{h}\right)\right)\right)'' = \frac{1}{h}\bar{\Phi}_2''\left(\frac{x-x_i}{h}\right)$$

$$\phi_g''\cdot\phi_g = \begin{cases} \frac{1}{h^2}\left(\bar{\Phi}_4''\left(\frac{x-x_{i-1}}{h}\right)\right)^2 \\ \frac{1}{h^2}\left(\bar{\Phi}_2\left(\frac{x-x_i}{h}\right)\right)^2 \end{cases}$$

$$\phi_1\cdot\phi_2 = \begin{cases} \frac{1}{h^2}\left(\bar{\Phi}_3''\left(\frac{X-X_{i-1}}{h}\right)\right)^2 \\ \frac{1}{h^2}\left(\bar{\Phi}_1''\left(\frac{x-x_i}{h}\right)\right)^2 \end{cases}$$

Komplett (gleich is)

$$\begin{cases} \frac{1}{h^2}\bar{\phi}_3''\left(\frac{x-x_{i-1}}{h}\right) \cdot \bar{\phi}_4''\left(\frac{x-x_{i-1}}{h}\right) \\ \frac{1}{h_2}\bar{\phi}_1''\left(\frac{x-x_i}{h}\right) \cdot \bar{\phi}_2''\left(\frac{x-x_i}{h}\right) \end{cases}$$

Teilweise (ungleich is ... Komponente 1 haben)

$$\phi_{2(i+1)-1} = \begin{cases} \frac{1}{h}\bar{\phi}_3''\left(\frac{x-x_i}{h}\right) & x \in [x_i, x_{i+1}] \quad \mathrm{I} \\ \frac{1}{h}\bar{\phi}_1''\left(\frac{x-x_{i+1}}{h}\right) & x \in [x_{i+1}, x_{i+2}] \quad \mathrm{II} \end{cases}$$

$$\phi_{2i} = \begin{cases} \frac{1}{h}\bar{\phi}_4''\left(\frac{x-x_{i-1}}{h}\right) & x \in [x_{i-1}, x_i] \quad \mathrm{III} \\ \frac{1}{h}\bar{\phi}_2''\left(\frac{x-x_i}{h}\right) & x \in [x_i, x_{i+1}] \quad \mathrm{IV} \end{cases}$$

(I 4 IV $\quad \phi : \left(\frac{1}{h^2}\bar{\phi}_3''\left(\frac{x-x_i}{h}\right) \bar{\phi}_2\left(\frac{x-x_i}{h}\right) \right.$