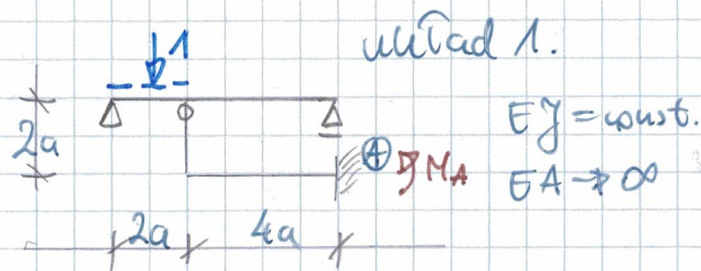


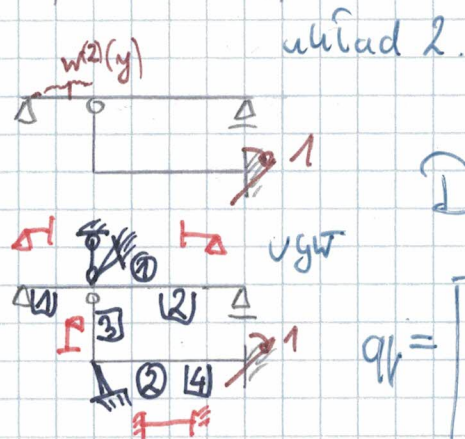
zol. 1.2. r.a. 2024/25 MK 2



2 tw. Bettiego

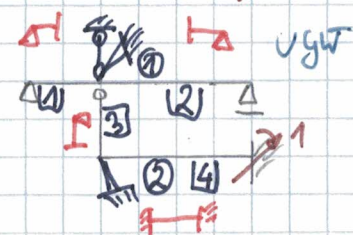
$$L_{12} = 1 \cdot w^{(2)}(y) + M_A(-1)$$

$$L_{21} = 0$$



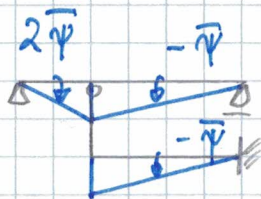
$$M_A(y) = w^{(2)}(y)$$

Deformacja układu 2. $\rightarrow$ MP



$$q_i = \begin{bmatrix} u_1 \\ u_2 \\ \psi \end{bmatrix}$$

P.P.



r.r. MP $\Phi_1^{(1)} + \Phi_1^{(2)} = 0 \quad (1)$

$\Phi_2^{(3)} + \Phi_2^{(4)} = 0 \quad (2)$

$$\Phi_1^{(1)}(2\bar{\psi}) + \Phi_1^{(2)}(-\bar{\psi}) + (\Phi_2^{(4)} + \Phi_A^{(4)})(-\bar{\psi}) = 0 \quad (3)$$

Momenty wyjściowe $\Phi_2^{(64)} = \frac{2EI}{4a} [1] = \frac{1}{2} \frac{EI}{a}$ $\Phi_A^{(64)} = \frac{EI}{a}$

WT 1) $\Phi_1^{(1)} = \frac{3EI}{2a} [u_1 - 2\bar{\psi}] = \frac{EI}{a} [\frac{3}{2} u_1 - 3\bar{\psi}] \quad (-2)$

2) $\Phi_1^{(2)} = \frac{2EI}{4a} [u_1 + \bar{\psi}] = \frac{EI}{a} [\frac{1}{2} u_1 + \frac{1}{2} \bar{\psi}] \quad (1)$

3) $\Phi_2^{(3)} = \frac{3EI}{2a} [u_2] = \frac{EI}{a} [\frac{3}{2} u_2]$

4) $\Phi_2^{(4)} = \frac{2EI}{4a} [2u_2 + 3\bar{\psi}] + \Phi_2^{(64)} = \frac{EI}{a} [u_2 + \frac{3}{2} \bar{\psi}] + \frac{1}{2} \frac{EI}{a}$

$\Phi_A^{(4)} = \frac{EI}{a} [\frac{1}{2} u_2 + \frac{3}{2} \bar{\psi}] + \frac{EI}{a} \quad (1)$

$$\frac{EI}{a} \begin{bmatrix} 2.25 & 0 & -2.25 \\ 0 & 2.5 & 1.5 \\ -2.25 & 1.5 & 9.75 \end{bmatrix} \begin{bmatrix} u_1 \\ u_2 \\ \psi \end{bmatrix} = \begin{bmatrix} 0 \\ -\frac{1}{2} \\ -\frac{3}{2} \end{bmatrix} \frac{EI}{a}$$

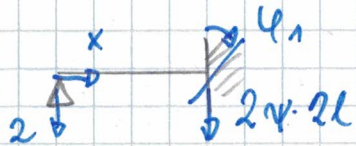
$$u_1 = -0.182$$

$$u_2 = -0.091$$

$$\psi = -0.182$$

linia ugięcia prosta nr 2

$$\xi = \frac{x}{2a}$$



$$w(\xi) = A\xi^3 + B\xi^2 + C\xi + D$$

$$\varphi(\xi) = \frac{1}{2a} w'(\xi) = \frac{1}{2a} [3A\xi^2 + 2B\xi + C]$$

$$M(\xi) = -\frac{Eg}{(2a)^2} w''(\xi) = -\frac{Eg}{(2a)^2} [6A\xi + 2B]$$

$$w(0) = 0 \Rightarrow D = 0$$

$$M(0) = 0 \Rightarrow B = 0$$

$$A = 0,182a$$

$$w(1) = 4q l \Rightarrow A + C = 4q a$$

$$C = -0,909a$$

$$\varphi(1) = \varphi_1 \Rightarrow \frac{1}{2a} [3A + C] = \varphi_1$$

$$w(\xi) = 0,182a \xi^3 - 0,909a \xi \quad \eta = \frac{\varphi}{2a}$$

$$M_+(\eta) = 0,182a \eta^3 - 0,909a \eta$$