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Frühjahrssemester

# BAUSTATIK II – HAUSÜBUNG 4, RESULTATE

(101-0114)

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**Aufgabe 1 a)**

Elastische Phase:

$$N_1 = \frac{4-\alpha}{10} F = \frac{7}{20} F$$

$$N_2 = \frac{1+\alpha}{5} F = \frac{3}{10} F$$

$$N_3 = \frac{4+9\alpha}{10} F = \frac{17}{20} F$$

Fliesslast:

$$F_y = \frac{10}{4+9\alpha} A f_y = \frac{20}{17} A f_y$$

Stabkräfte bei Fliessbeginn:

$$N_{1y} = \frac{4-\alpha}{4+9\alpha} A f_y = \frac{7}{17} A f_y$$

$$N_{2y} = \frac{2(1+\alpha)}{4+9\alpha} A f_y = \frac{6}{17} A f_y$$

$$N_{3y} = A f_y$$

Durchbiegungen bei Fliessbeginn:

$$w_{1y} = \frac{4-\alpha}{4+9\alpha} \cdot \frac{f_y \cdot l}{2E} = \frac{7}{34} \frac{f_y l}{E}$$

$$w_{2y} = \frac{2(1+\alpha)}{4+9\alpha} \cdot \frac{f_y \cdot l}{E} = \frac{6}{17} \frac{f_y l}{E}$$

$$w_{3y} = \frac{f_y \cdot l}{2E}$$

Elastisch-plastische Phase:

$$N_1 = A f_y - \alpha \cdot F = A f_y - \frac{F}{2}$$

$$N_2 = (1+2\alpha) \cdot F - 2 A f_y = 2F - 2 A f_y$$

$$N_3 = A f_y$$

Traglast:

$$F_u = \frac{3}{1+2\alpha} A f_y = \frac{3}{2} A f_y$$

Stabkräfte bei Traglast:

$$N_{1u} = \frac{1-\alpha}{1+2\alpha} A f_y = \frac{1}{4} A f_y$$

$$N_{2u} = A f_y$$

$$N_{3u} = A f_y$$

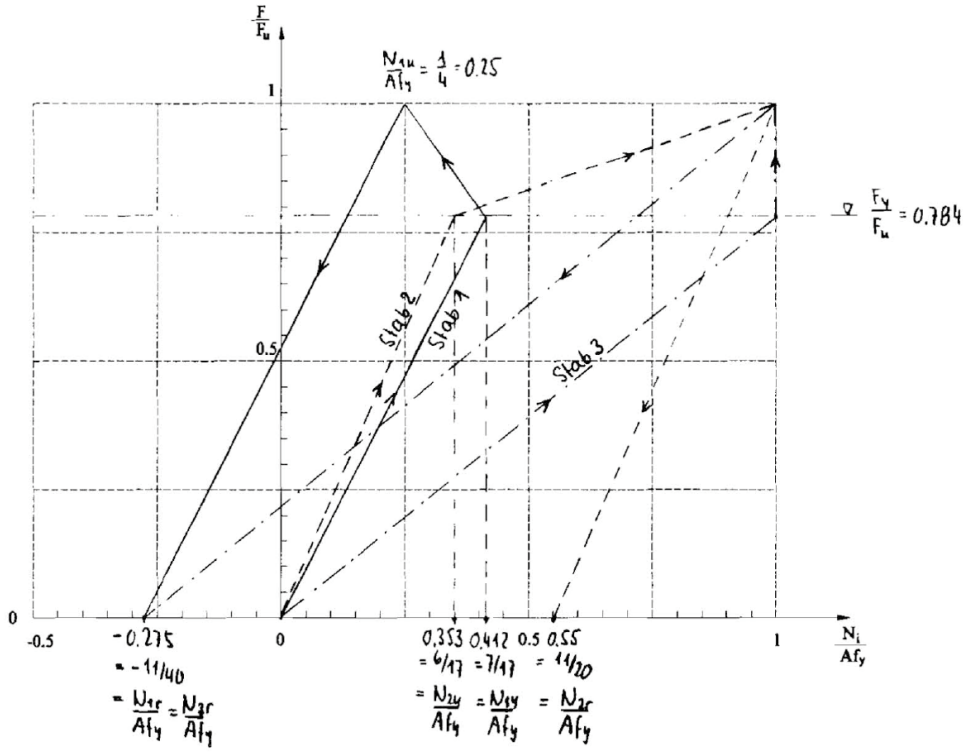
Durchbiegungen bei Traglast:

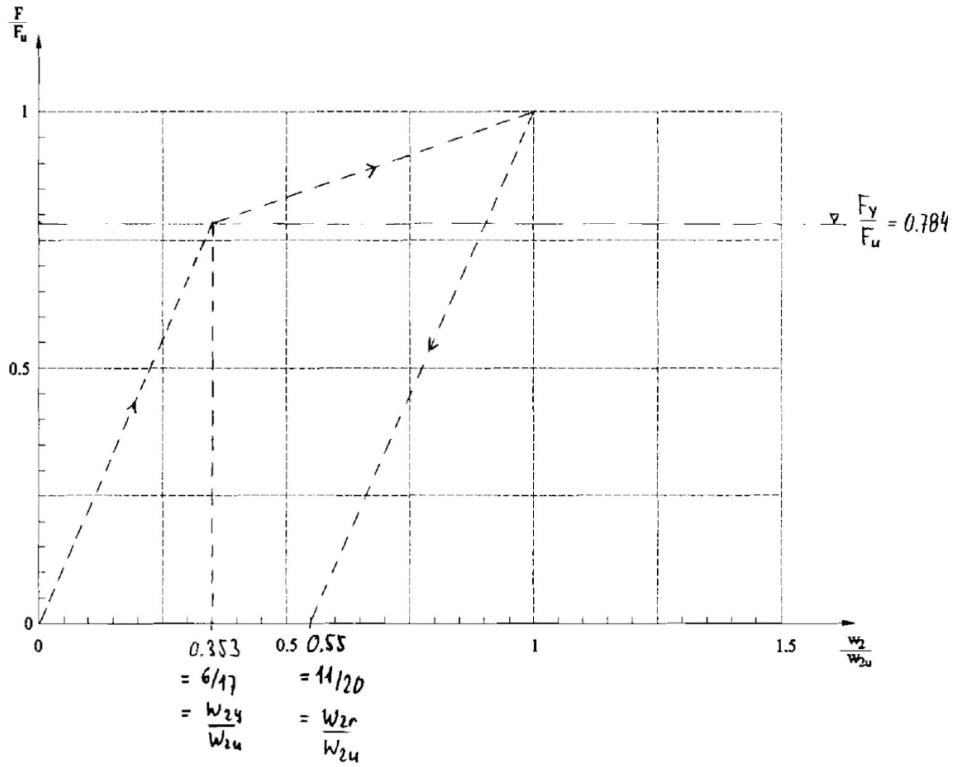
$$w_{1u} = \frac{f_y \cdot l}{2E} \cdot \frac{1-\alpha}{1+2\alpha} = \frac{1}{8} \frac{f_y l}{E}$$

$$w_{2u} = \frac{f_y \cdot l}{E}$$

$$w_{3u} = \frac{3 f_y \cdot l}{2E} \cdot \frac{1+3\alpha}{1+2\alpha} = \frac{15}{8} \frac{f_y l}{E}$$

b)


F/Fu
1
0.5
0
-0.5
Nsu/Afy = 1/4 = 0.25
Fy/Fu = 0.784
Stab 2
Stab 1
Stab 3
-0.275
= -11/40
= N1r/Afy = N3r/Afy
0.353
= 6/17
= N2u/Afy
0.412
= 7/17
= N1y/Afy
0.5
0.55
= 11/20
= N2r/Afy
1
Ni/Afy


F/Fu
1
0.5
0
Fy/Fu = 0.784
0.353
= 6/17
= w2y/w2u
0.5
0.55
= 11/20
= w2r/w2u
1
1.5
w2/w2u