

1 a) $N_{1r} = -\frac{1}{10} \cdot \frac{2+7\alpha}{1+2\alpha} \cdot Af_y = N_{3r}$; $N_{2r} = \frac{1}{5} \cdot \frac{2+7\alpha}{1+2\alpha} \cdot Af_y$

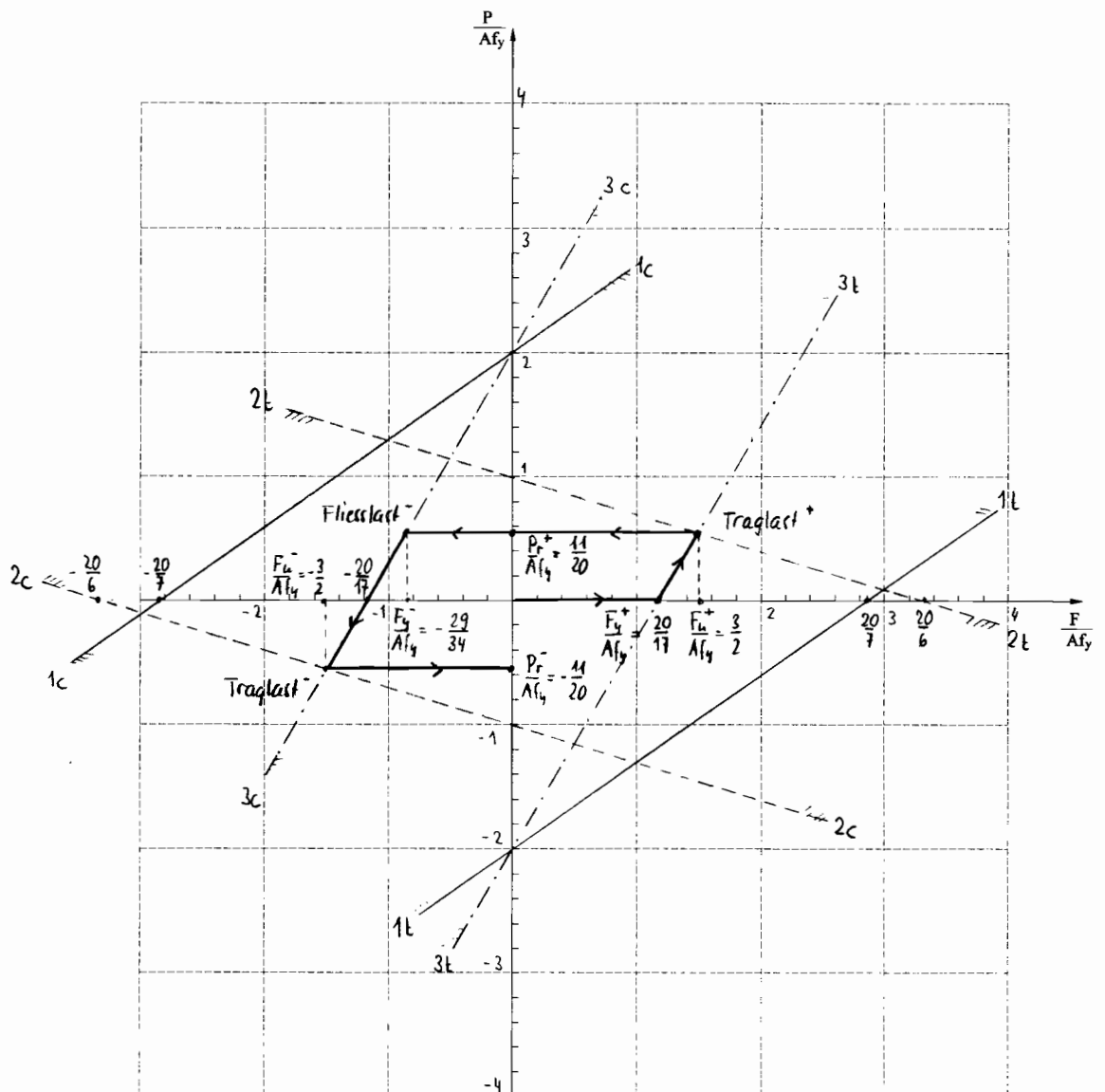
$w_{1r} = -\frac{1}{20} \cdot \frac{2+7\alpha}{1+2\alpha} \cdot \frac{f_y \cdot l}{E}$; $w_{2r} = \frac{1}{5} \cdot \frac{2+7\alpha}{1+2\alpha} \cdot \frac{f_y \cdot l}{E}$; $w_{3r} = \frac{9}{20} \cdot \frac{2+7\alpha}{1+2\alpha} \cdot \frac{f_y \cdot l}{E}$

b) $N_{1r} = N_{3r} = -\frac{11}{40} Af_y$; $N_{2r} = \frac{11}{20} Af_y$

$w_{1r} = -\frac{11}{80} \cdot \frac{f_y \cdot l}{E}$; $w_{2r} = \frac{44}{80} \cdot \frac{f_y \cdot l}{E}$; $w_{3r} = \frac{99}{80} \cdot \frac{f_y \cdot l}{E}$

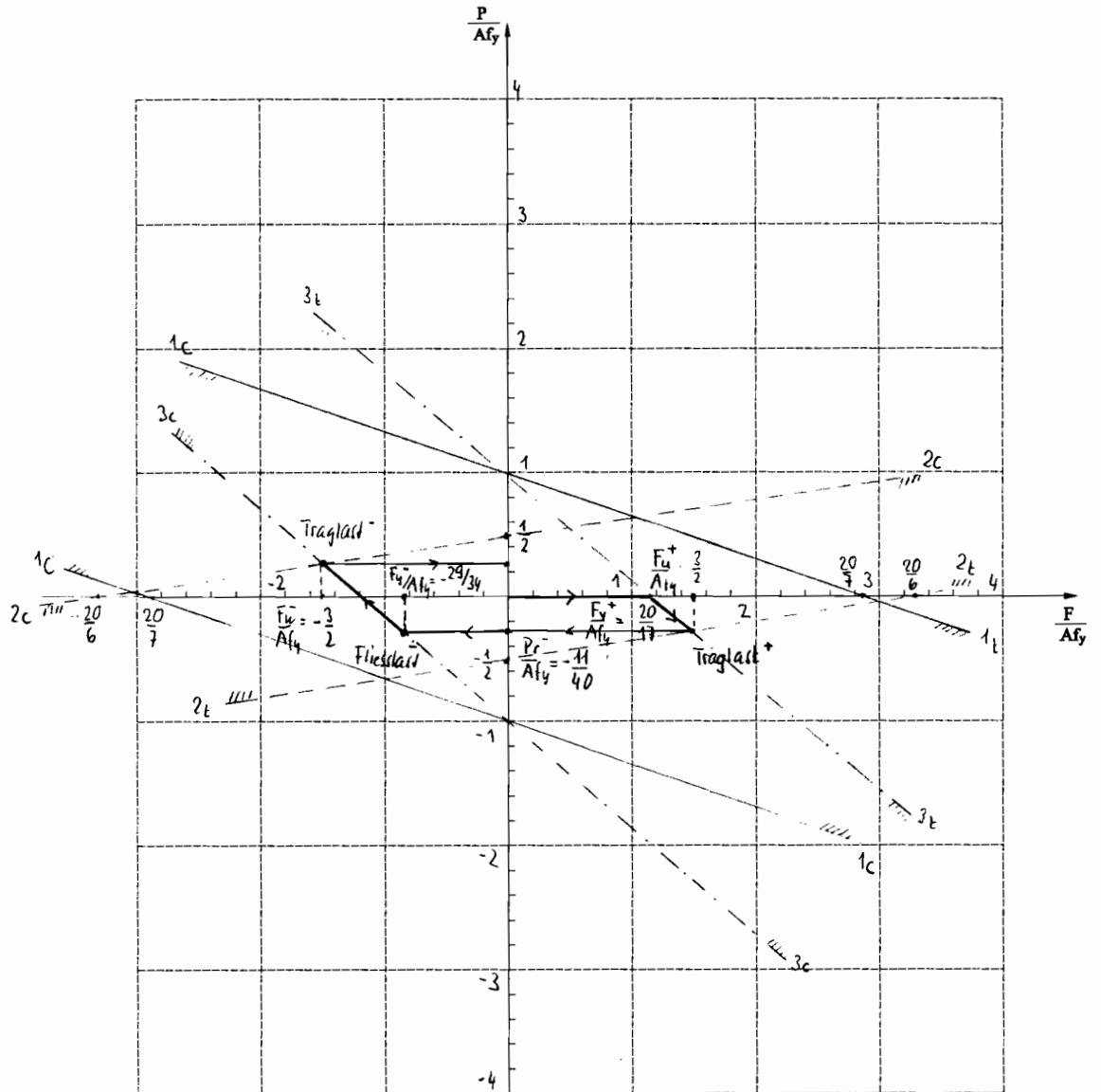
c) Fließfigur: normiert auf Stab 2

$$\{N\} = P \begin{Bmatrix} -1/2 \\ 1 \\ -1/2 \end{Bmatrix} + F \cdot \begin{Bmatrix} 7/20 \\ 6/20 \\ 17/20 \end{Bmatrix}$$



oder Fließfigur normiert auf Stab 1 (resp Stab 3)

$$\{N\} = P \cdot \begin{Bmatrix} 1 \\ -2 \\ 1 \end{Bmatrix} + F \cdot \begin{Bmatrix} 7/20 \\ 6/20 \\ 17/20 \end{Bmatrix}$$



2a) Elastische Phase:

$$N_1 = N_4 = -\frac{F}{2(1+\sqrt{2})} ; N_2 = N_3 = \frac{F}{2} ; N_5 = \frac{\sqrt{2}F}{2(1+\sqrt{2})}$$

Fließbeginn:

$$F_y = 2Af_y ; N_{2y} = N_{3y} = Af_y ; N_{1y} = N_{4y} = -\frac{Af_y}{1+\sqrt{2}} ; N_{5y} = \frac{\sqrt{2}Af_y}{1+\sqrt{2}}$$

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

Plastische Phase:

$$N_2 = N_3 = Af_y ; N_1 = N_4 = Af_y - \frac{\sqrt{2}}{2}F ; N_5 = F - \sqrt{2}Af_y$$

Traglast:

$$F_u = (1+\sqrt{2})Af_y ; N_{2u} = N_{3u} = N_{5u} = Af_y ; N_{1u} = N_{4u} = -\frac{\sqrt{2}}{2}Af_y$$

$$w_{Bu} = (1+\sqrt{2}) \cdot \frac{f_y \cdot l}{E}$$

b) $F_y/F_u = 0.83$; $N_{1y}/Af_y = N_{4y}/Af_y = 0.41$; $N_{2y}/Af_y = N_{3y}/Af_y = 1$; $N_{5y}/Af_y = 0.59$; $w_{By}/w_{Bu} = 0.59$

