$$\mathcal{L}_{CE} = -\sum_{j=1}^{K} y_j \ln \hat{y}_j$$

$y_i = 1$

	A	B	C	D
	0	1	0	0

$j \rightarrow \quad 1 \quad 2 \quad 3 \quad 4$

$K = 4$

$\hat{y}_j \in [0; 1]$

$\ln \hat{y}_j \in (-\infty; 0]$

$\mathcal{L}_{CE} = -1 \cdot \ln \hat{y}_j$

pred

	0	1	
0			995
1			5

model N1: const 1

model N2: const 0
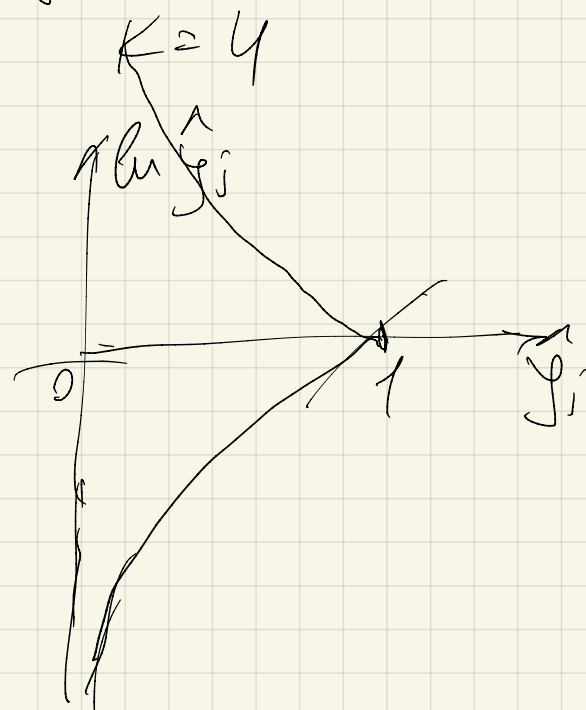
$$P = \frac{TP}{TP + FP}$$

$$R = \frac{TP}{TP + FN}$$

$$F_1 = \frac{PR}{P + R}$$

$F_1^{(1)} = 0{,}49 \; ? \quad Acc = 0{,}005$

$F_1^{(0)} = 0{,}0049 \; ? \quad Acc = 0{,}995$

model

	0	1	
g.t. 0	0 (TN)	995 (FP)	995
1	0 (FN)	5 (TP)	5

$$P = \frac{TP}{TP+FP} = \frac{5}{1000} = 0.005$$

$$R = \frac{TP}{TP+FN} = 1$$

$$F_1^{(1)} = \frac{PR}{P+R} = \frac{0.005}{1.005} = 0.0049$$

model

	0	1	
g.t. 0	995	0	995
1	5	0 (TP)	5

$$P = 0 \qquad R = 0$$

$$F_1 = \frac{PR}{P+R+\varepsilon} = 0$$