Exercice 1 **Computational graph exercise**

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0

$(-1) \cdot z$

dr/dq . dq/dz=e^q . -e^-z = 1 . -1 = -1

q

e^q = 1

$e^{\wedge}(-z)$

ds/dr . dr/dq=(-1/(1+r)^2) . 2(1+r) . 1 . e^q = -1/4 . 4 . 1 . 1 = -1

r

1+r = 2

$1 + e^{\wedge}(-z)$

df/ds . ds/dr=(-1/s^2) . (-1/(1+r)^2) . 2(1+r) . 1 = -1/4 . -1/4 . 4 . 1 = 1/4

s

1/s = 1/2

$1/(1 + e^{\wedge}(-z))$

df/df . df/ds=1 . (-1/s^2) = 1 . (-1/4) = -1/4

X1 = 1

W1 = 1

1

$x1 \cdot w1$

dz/dz1 . dz1/dw1=1 . x1 = x1

z1

0

$z1 + z2 + b$

dy_hat/dz . dz/dz1=½ . (1-½) . 1 = ¼
dy_hat/dz . dz/dz2=½ . (1-½) . 1 = ¼
dy_hat/dz . dz/db=½ .(1-½) . 1 = ¼

z

1/2

sigmoid(z)

df/df . dy_hat/dz=1 . ½ . (1-1/2) = 1/4

y_hat

Loss(y_hat)

df/df=1

X2 = 1

W2 = 2

2

$x2 \cdot w2$

dz/dz2 . dz2/dw2=1 . x2 = x2

z2

b = -3