

SolutionHA2

November 19, 2019

```
[1]: import numpy as np

M= np.array([[0.6,1.3,0.6],
[1, -0.4 , 1.7],
[-1.2, 2, 0.2],
[0.7,-0.1, 1.1]])

#Also: 3D Eingabe, 4D Ausgabe!

a = [1,0.3,3,2.1]

#Also: 4D Eingabe

def RLU(x):
    vec = []
    for c in x:
        if c<0:
            c = c*0.0001
        vec.append(c)
    return vec

#Beliebig

def softmax(x):
    norm = sum(np.exp(x))
    vec = []
    for c in x:
        vec.append(np.exp(c)/norm)
    return vec

#Beliebig

[2]: def prePerzeptron(x):
    out = RLU(M.dot(x)+a)
    return out
```

```
def perzeptron(x):  
    out = softmax(RLU(M.dot(x)+a))  
    return out
```

```
#Global:  $R^3 \rightarrow R^4$ 
```

```
[3]: prePerzeptron([1.2,3,-0.3])
```

```
[3]: [5.44, -2.1000000000000026e-05, 7.5, 2.31]
```

```
[4]: prePerzeptron([-1.2,2.1,0.4])
```

```
[4]: [3.2500000000000004, -0.00010599999999999999, 8.72, 1.4900000000000002]
```

```
[5]: perzeptron([1.2,3,-0.3])
```

```
[5]: [0.1124350083524803,  
      0.0004878995917919659,  
      0.8821616811564627,  
      0.00491541089926509]
```

```
[6]: perzeptron([-1.2,2.1,0.4])
```

```
[6]: [0.0041898679254780075,  
      0.0001624415900087801,  
      0.9949268452278378,  
      0.0007208452566754307]
```