INSEA

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# Machine learning classique

# Intro to neural nets

# Comment adapter ce modèle à des données plus complexes ?

Linéarités

$$z_1 \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\mathbf{1}} + \alpha_1$$

$$z_2 \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\mathbf{2}} + \alpha_2$$

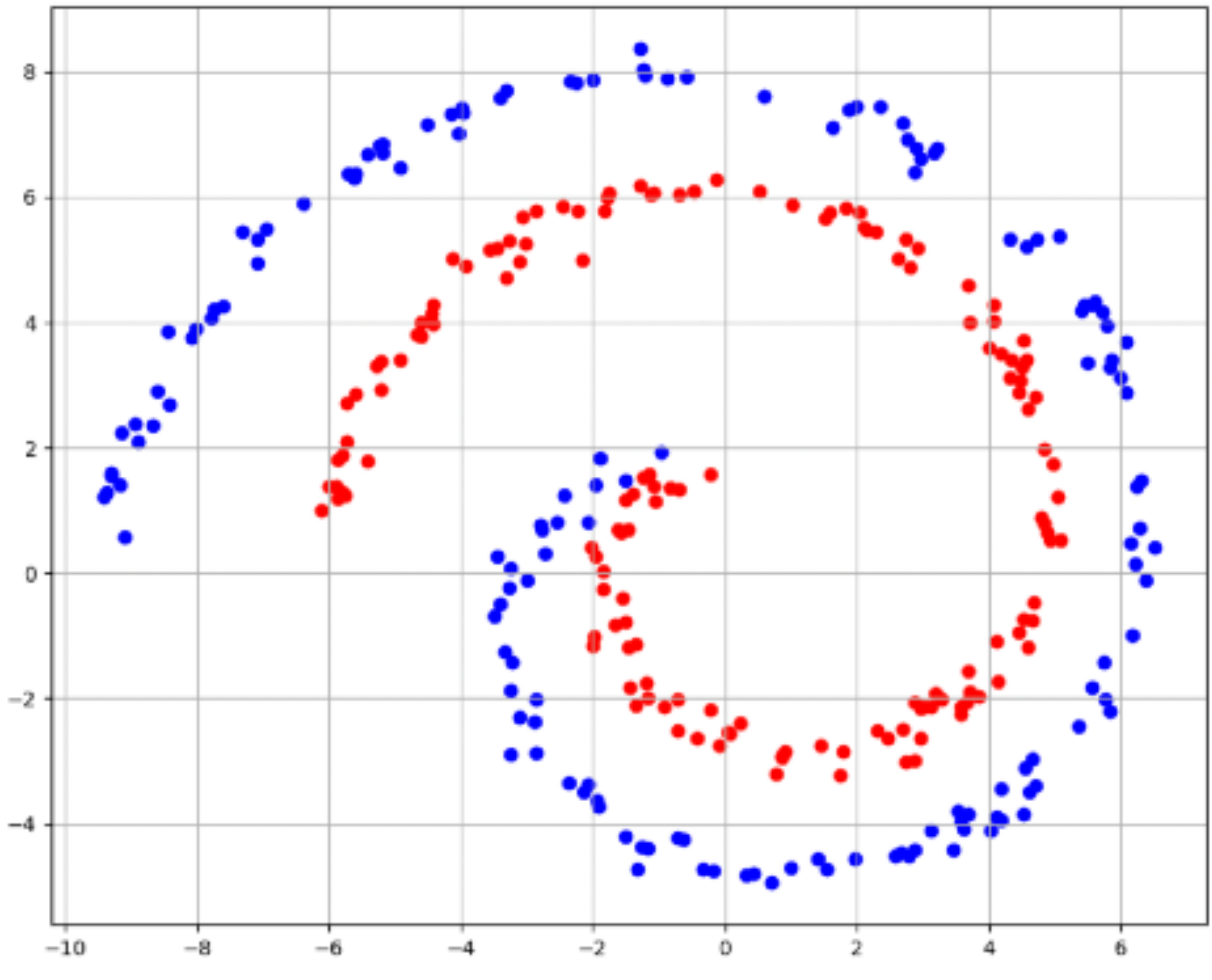
$$\vdots$$

$$z_p \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\boldsymbol{p}} + \alpha_p$$

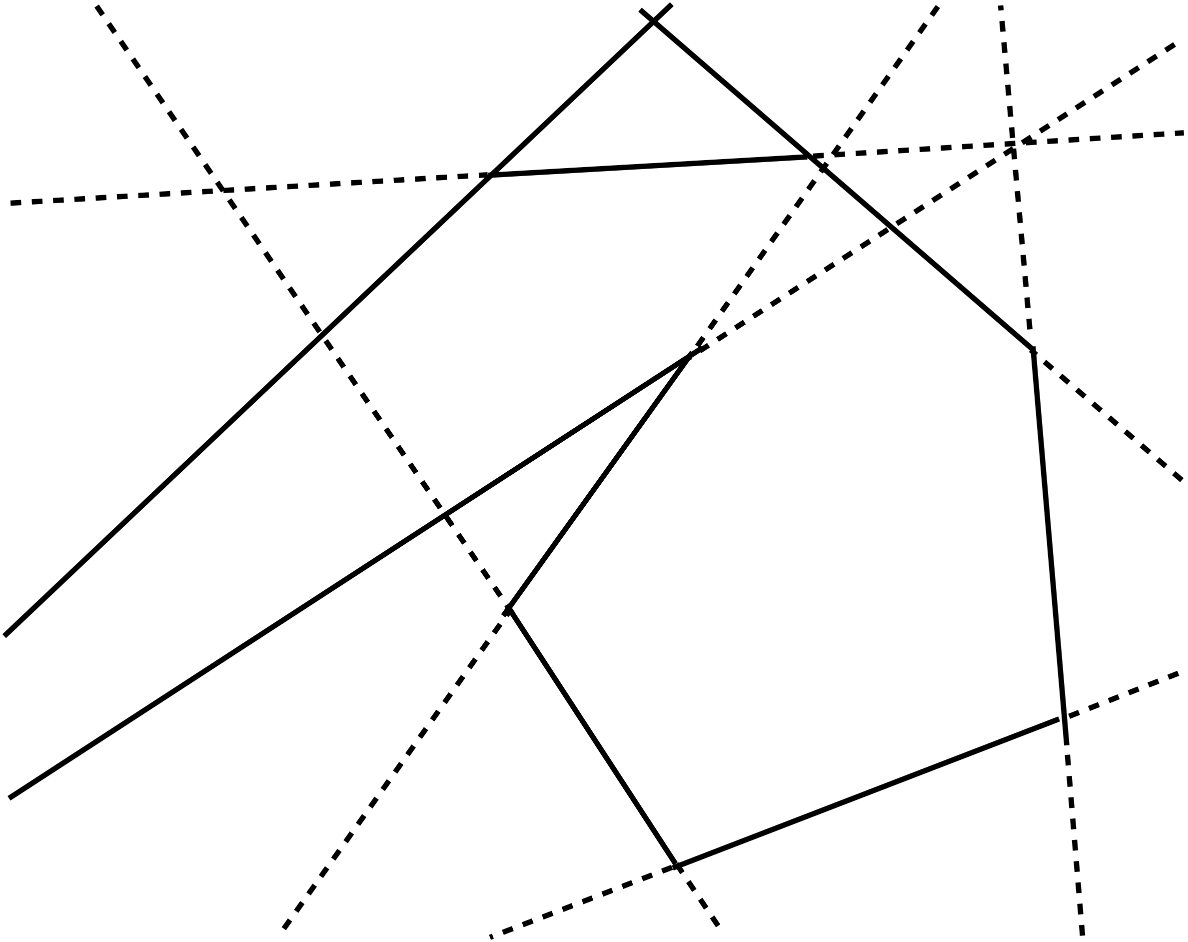
non-linéarité

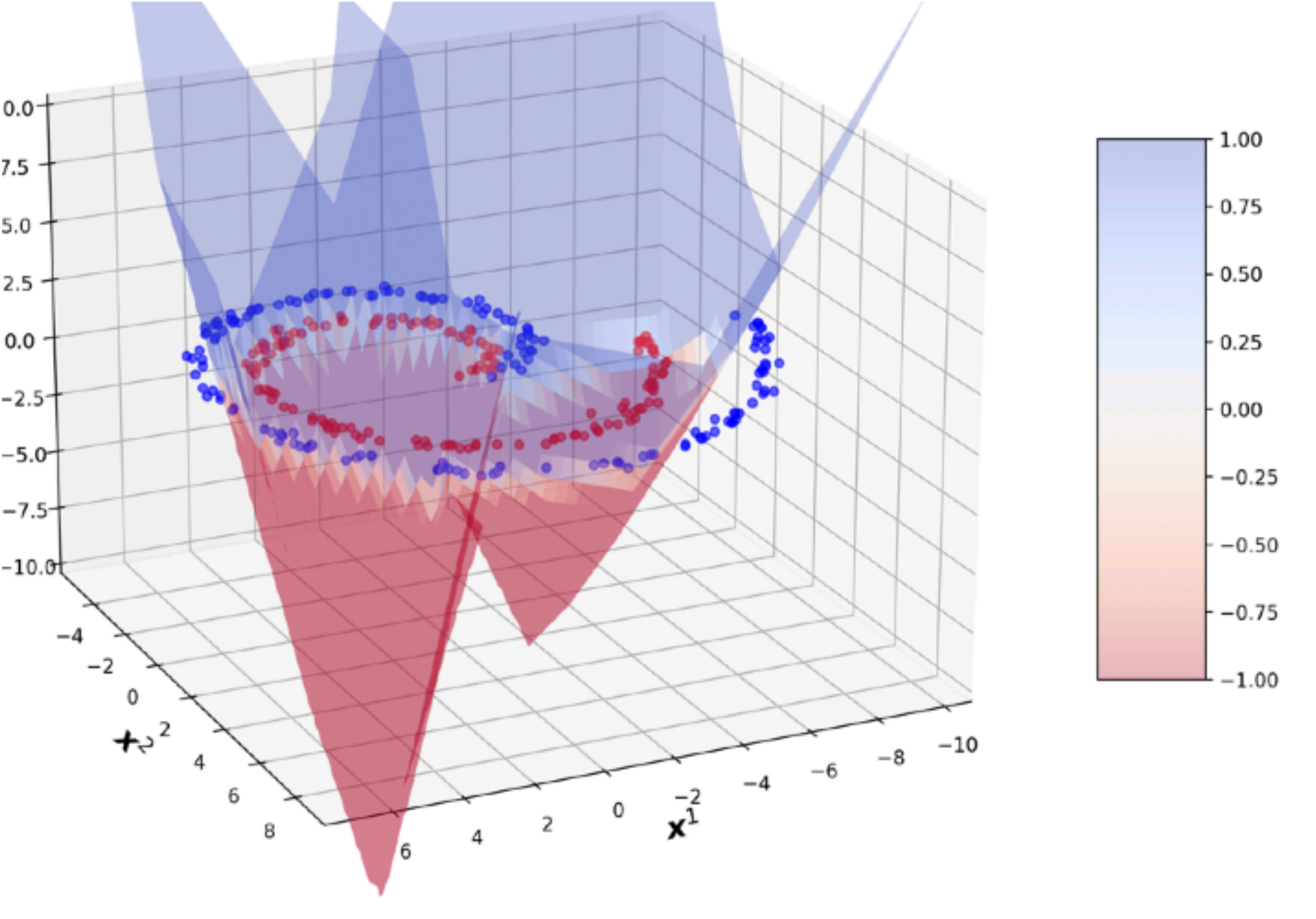
$$\max(z_1, \ldots, z_p)$$

sigmoid

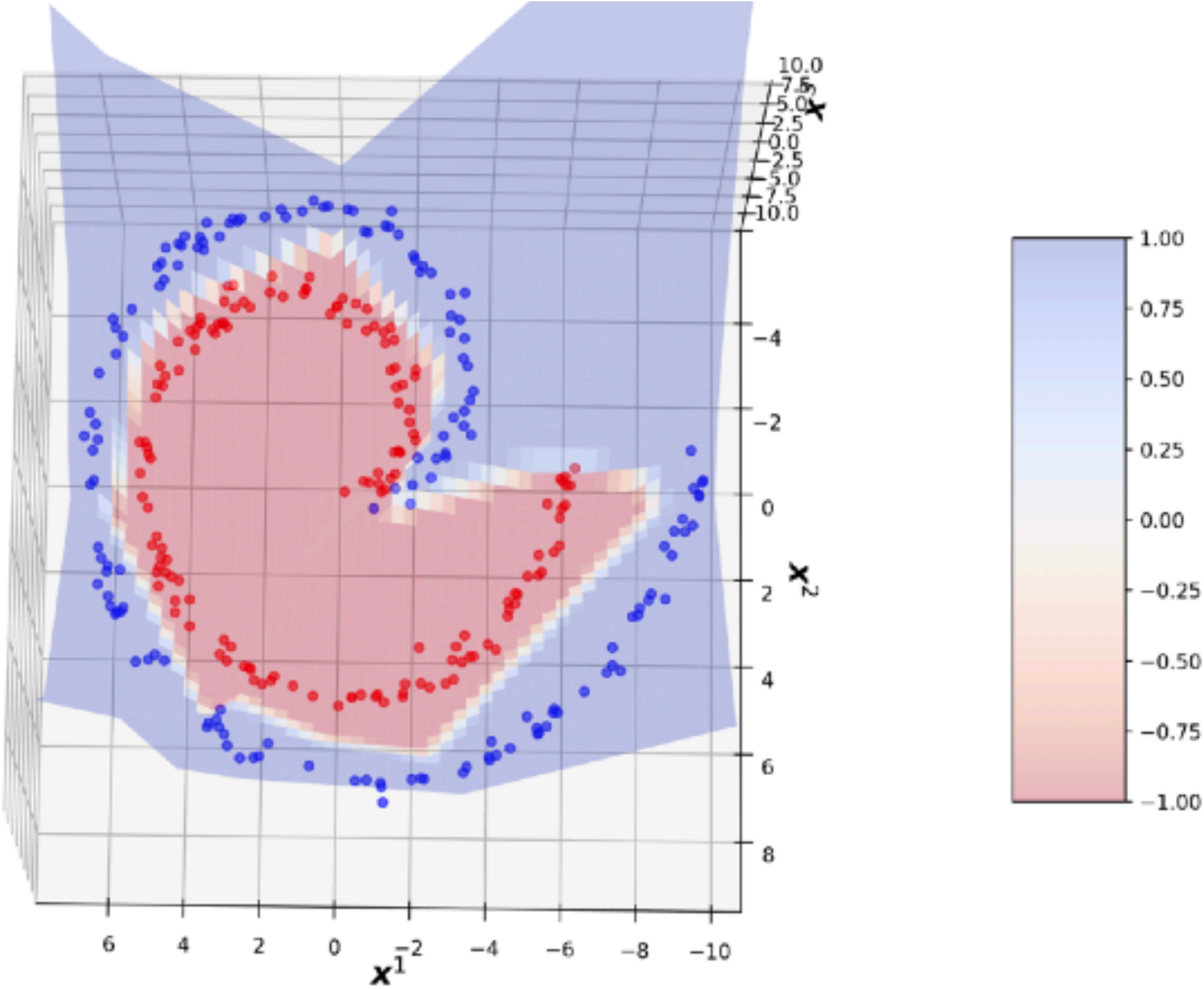


8
6
4
2
0
−2
−4
−10
−8
−6
−4
−2
0
2
4
6



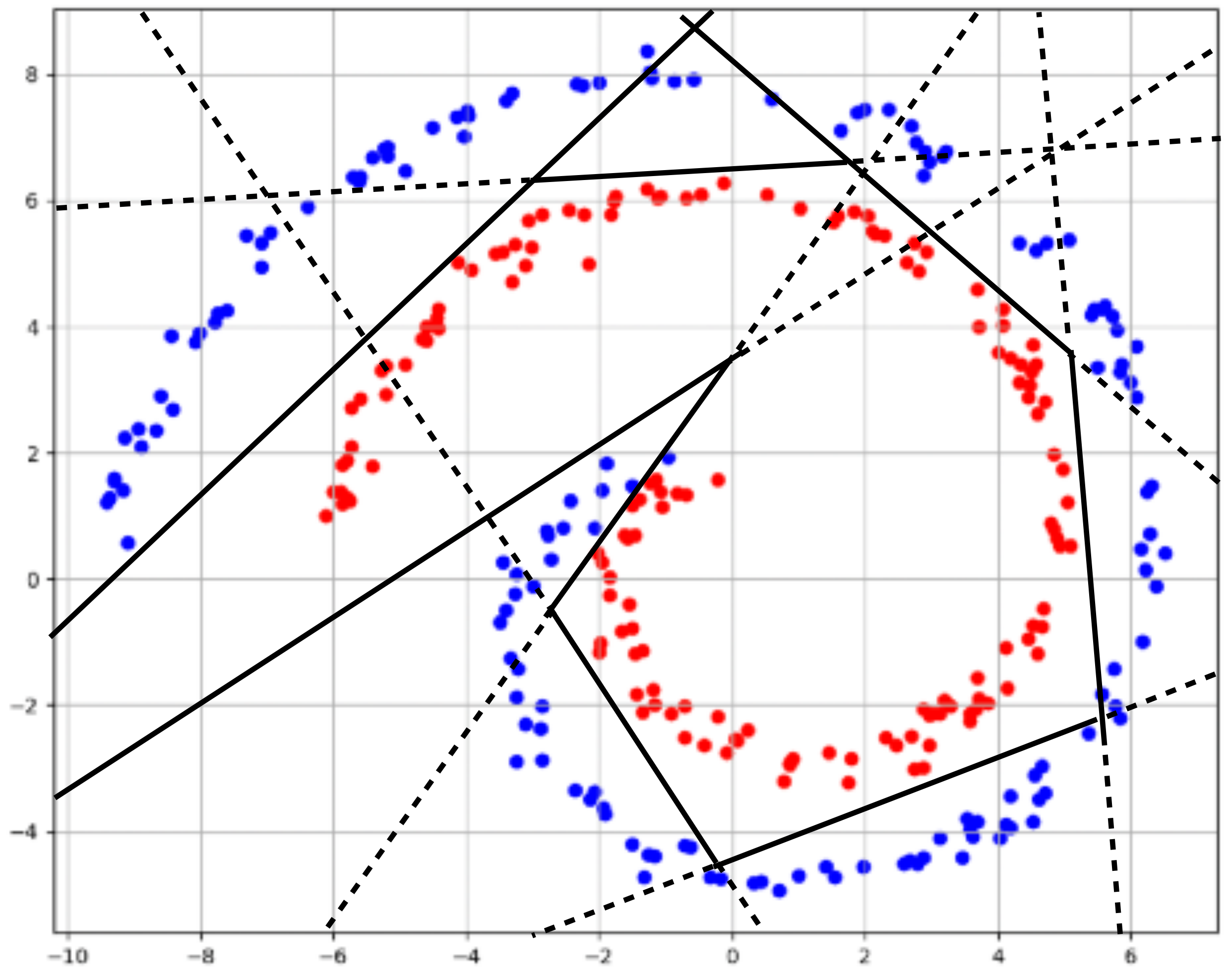


0.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−4
−2
0
2
4
6
8
6
4
2
0
−2
−4
−6
−8
−10
x1
x2
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00



x¹
x²
x
6
4
2
0
−2
−4
−6
−8
−10
8
10.0
7.5
5.0
2.5
0.0
−2.5
−5.0
−7.5
−10.0
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00

Comment adapter ce modèle à des données plus complexes ?



Linéarités

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$$\vdots$$

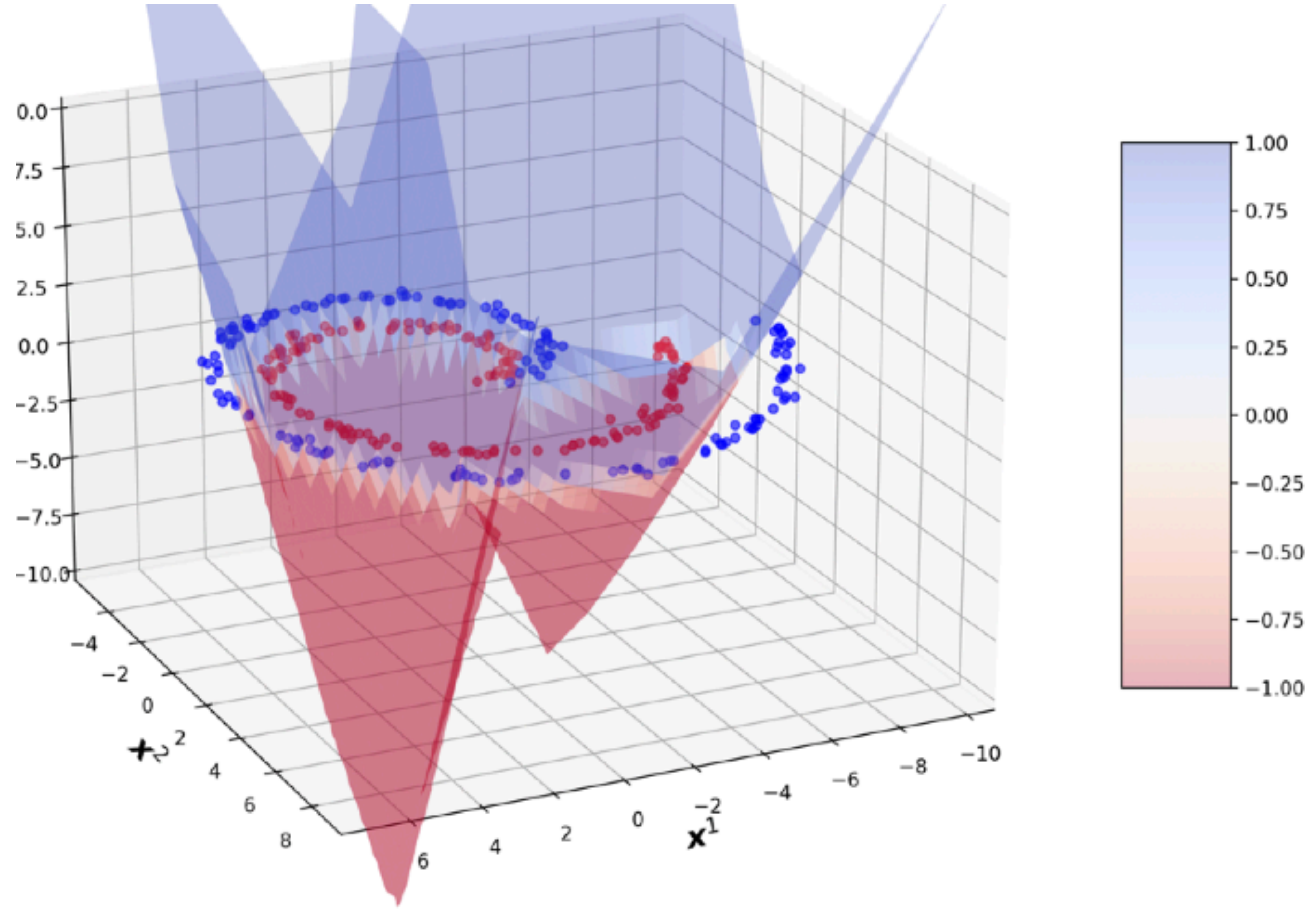
$$z_p \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\boldsymbol{p}} + \alpha_p$$

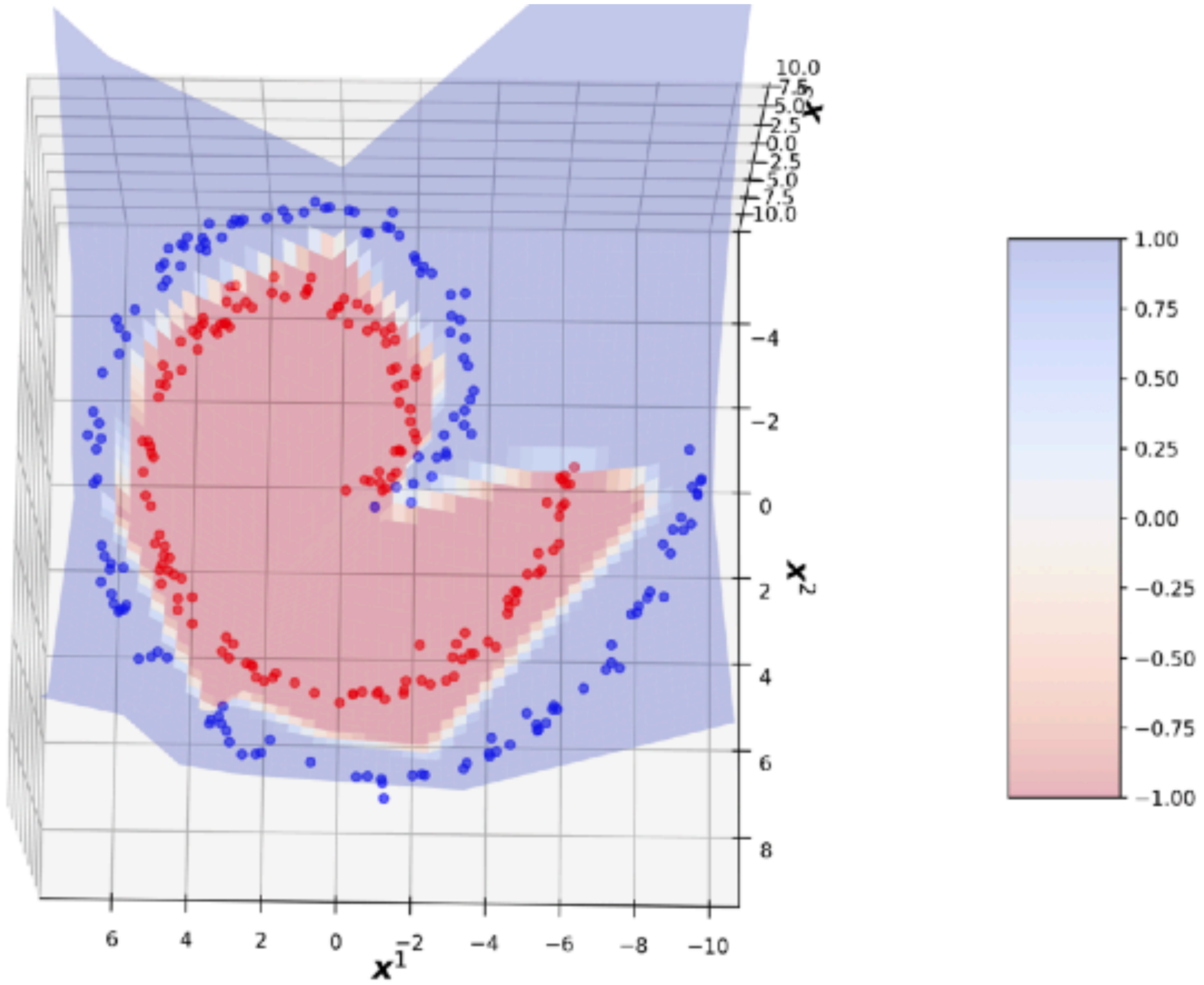
non-linéarité

$$\max(z_1, \ldots, z_p)$$

$$\downarrow$$

sigmoid





Linéarités

$$z_1 \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\mathbf{1}} + \alpha_1$$

$$\vdots$$

$$z_p \stackrel{\text{def}}{=} \mathbf{x}^\top \boldsymbol{\beta}^{\boldsymbol{p}} + \alpha_p$$

non-linéarité

$$\max(z_1, \ldots, z_p) \longrightarrow \text{sigmoid}$$

En pratique, ce modèle ne fonctionne pas pour ces données complexes. Pourquoi à votre avis ?