# Non-Linear Models

## Homework Questions

### Chapter 5

## Class Work 1

- Assume there are 2 predictors P = 2 ($x_1$, $x_2$)
- Assume a NN with 2 hidden layers M=2 ($z_1$, $z_2$)
- Assume two outputs $Y_1$, $Y_2$ (K=2)
- Assume ALL weights of NN is initialized to 0.

$\alpha 1 = (\alpha 01, \alpha 11, \alpha 21)$, $\alpha 2 = (\alpha 02, \alpha 12, \alpha 22)$

$\beta 1 = (\beta 01, \beta 11, \beta 22)$, $\beta 2 = (\beta 02, \beta 12, \beta 22)$

- Compute the prediction [$Y_1$, $Y_2$] of the forward propagation with same (3, 2, [1,0])

Class Work 2

- Assume there are 2 predictors P = 2 ($x_1$, $x_2$)
- Assume a NN with 2 hidden layers M=2 ($z_1$, $z_2$)
- Assume ONE output $Y_1$ (K=1)
- Assume ALL weights of NN is initialized to 0

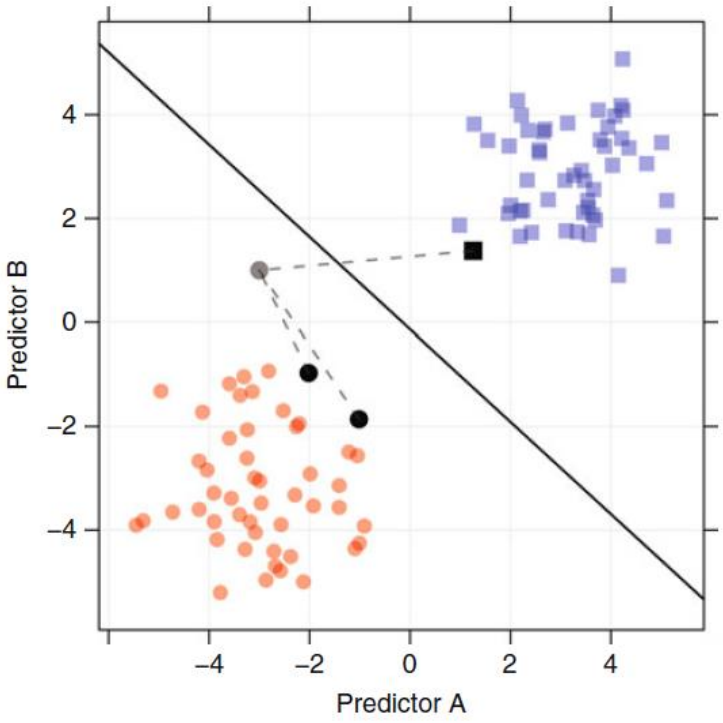
$\alpha 1 = (\alpha 01, \alpha 11, \alpha 21)$, $\alpha 2 = (\alpha 02, \alpha 12, \alpha 22)$

$\beta 1 = (\beta 01, \beta 11, \beta 22)$, $\beta 2 = (\beta 02, \beta 12, \beta 22)$

- Compute the prediction [$Y_1$, $Y_2$] of the forward propagation with same (3, 2, [1,0])

Classwork 3:

| | True class | Dot product | $y_i$ | $\alpha_i$ | Product |
|---|---|---|---|---|---|
| SV 1 | Class 2 | −2.4 | −1 | 1.00 | 2.40 |
| SV 2 | Class 1 | 5.1 | 1 | 0.34 | 1.72 |
| SV 3 | Class 1 | 1.2 | 1 | 0.66 | 0.79 |




Find the value of D(u) for the points

**u** = (-4, -2)

**u** = ((4,0)

And classify them.

Assume that margin points SV1, SV2, SV3 are SV1 (2,2), SV2 (-1,-2) and SV3 (-2, -1)