Bradley Reardon

6202 – HW 4

5/25/21

E.1

1. The “best decision boundaries” means they are places evenly distanced between the two groups they are separating.

**W1** = [-1 2]

**W2** = [1 2]

**b** = 0

1

[-1 2] -2 + 0 = 2 hardlims 2 = 1



[1 2] 0 1 -1 -1 -1

W1

W2

ii.

Hard Limit Layer

Input

2

2

a = hardlim(Wp+b)

a

n

2x1

2x1

+

W

b

2x1

2x2

2x1

P

iii.

E.2

i. Four classes

1

1

ii.

W1

-1

1

W2

1

-1

-1

-1

iii. n = [1 1] 1 + -2 = hardlims -2 = -1

[-1 1] -1 0 -2 -1

E.3.

a

(2, 2)

(1, 1)

p

a.1 = -1 \* 1 + 0.5 = -0.5 = 0

1 1 2 2

a.2 = [1 1] \* 0 + [-1] = 1

2

E.4

i. a = hardlims(p+1)

p = -2:2

a

p

ii. a = hardlim(-p+1)

p = -2:2

a

p

iii. a = purelin(2p+3)

a

(1, 6)

p = -2:2

(0, 3)

(-1, 1)

p

iv. a = satlins(2p+3)

p = -2:2

a

p

v. a = poslin(-2p-1)

a

p = -2:2

(-2, 3)

p

(-1, 1)

(-0.5, 0)

E5.

a.1.1 = satlin(2p + 2)

a.1.2 = satlin(p – 1)

a.2 = purelin(a.1.1 - a.1.2)

p = -3 : 3

(3, 8)

i. 2p+2

a

(-1, 0)

p

(-3, -4)

ii. satlin(2p+2)

a

p

iii. p-1

a

(3, 2)

p

(0, -1)

(-3, -4)

iv.  satlin(p-1)

a

p

(3, 6)

v. ((a.1.1\*p) + (a.1.2\*-p))

a

(0, 3)

p

(-3, 0)

vi.  purelin((a.1.1\*p) + (a.1.2\*-p))

a

(3, 6)

(0, 3)

p

(-3, 0)