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1. **True or False**

1.1 Yes

1.2 Yes

1.3 No. LSM asks for linear structure, but only the logit transformation log(P/(1-P)) is linear. But P can not be observed, only y, which is either 0 or 1, can be observed.

1.4 No. Predicted probabilities ∈ [0,1].

1.5 Yes.

1. **From Linear Regression to Classification**

2.1(a)

X = [[1,1,3],[1,-2,2],[1,0.3,1],[1,5,-1],[1,3,4],[1,7,3]]

XT = [[1,1,1,1,1,1],[1,-2,0.3,5,3,7],[3,2,1,-1,4,3]]

Y = [1,0,0,1,1,1]

XT \* X = [[ 6, 14.3, 12]

[14.3, 88.09, 27.3]

[12, 27.3, 40]]

XT \* Y = [4,16,9]

(XT\*X)-1 = [[ 0.53690677 -0.04723016 -0.12883745]

[-0.04723016 0.01855194 0.00150735]

[-0.12883745 0.00150735 0.06262247]]

β = [0.23240754 0.12147658 0.07236997]

y = 0.23 + 0.12x1 + 0.07x2

2.1(b)

Y^ = [0.571, 0.134, 0.341, 0.767, 0.886, 1.3]

Classifier: If Y^ > 0.5, Y=1

If Y^ < 0.5, Y=0

2.2

Discriminative function models the decision boundary between different classes.