

SL 08217

Logistic Regression Output
Response = survival, Terms = (Age Vel)
Coefficient Estimates

Label	Estimate	Std. Error	Est/SE	p-value
Constant	-16.9845	5.14715	-3.300	0.0010
Age	0.162501	0.0414345	3.922	0.0001
Vel	0.233906	0.0862480	2.712	0.0067

1) The survival outcomes of 58 side-impact collisions using crash dummies was examined. $x_1 = age$ is the "age" of the crash dummy while $x_2 = vel$ was the velocity of the automobile at impact. The group = response variable *survival* was coded as a 1 if the accident would have been fatal, 0 otherwise. Assume the case to be classified has x with $age = x_1 = 60.0$ and $velocity = x_2 = 50.0$.

a) Find ESP for x . $ESP = \hat{\alpha} + \hat{\beta}_1 x_1 + \hat{\beta}_2 x_2 =$

$$-16.9845 + 0.162501(60) + 0.233906(50) = \boxed{4.4609}$$

b) Is x classified in group 0 or group 1?

group 1 since $ESP > 0$

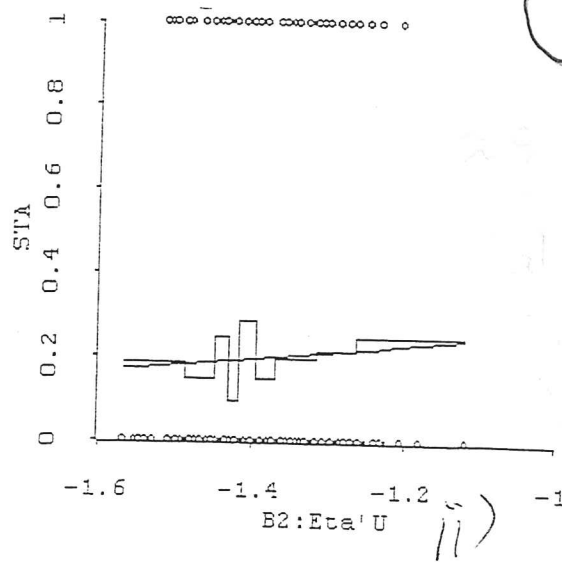
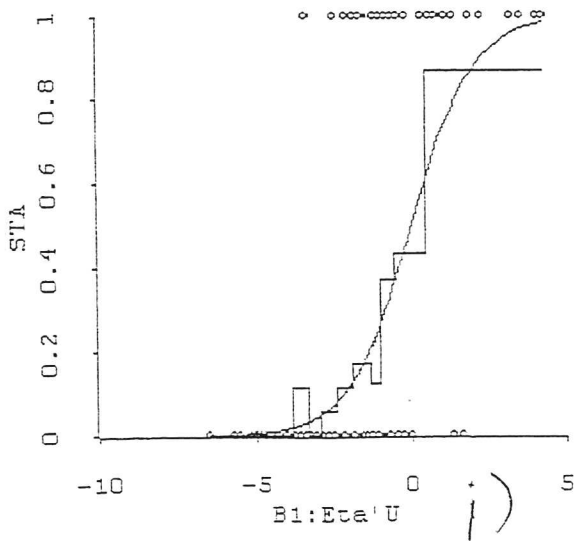
c) Find $\hat{p}(x)$.

$$= \frac{e^{ESP}}{1 + e^{ESP}} = \frac{86.56192}{87.56192} = \boxed{0.9886}$$

60

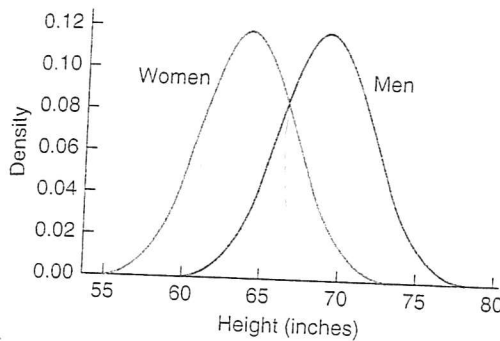
2) For the response plots shown below, which is better, plot i) or plot ii)?

Plot i)



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3) Consider classifying adult USA citizens into group 1 = Women and group 2 = Men by the height x of the individual. The probability density functions $f_1(x) = f_W(x)$ and $f_2(x) = f_M(x)$ are shown in the figure below. Give the maximum likelihood discriminant rule.



code
with
plot

$N(69, 9)$
 $N(64, 9)$

allocate x to group 1 (W) if $x < 66.5$
2 (M) if $x > 66.5$
66-68
66-68

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