$b(-\frac{1}{2})=0$ involves Z $\quad \frac{\partial L}{\partial b(-\frac{1}{2})}<0 \quad b(-\frac{1}{2})=0$

$X \quad b(0)>0 \qquad \frac{\partial L}{\partial b(0)}=0 \quad \frac{\partial L}{\partial b(\frac{1}{2})}=0$

$Y \quad b(\frac{1}{2})>0$

$\cancel{L \Rightarrow F(b(0)) + \lambda_X [0 - b(0)]}$

$\cancel{\frac{\partial F}{\partial b_0} - \lambda_X}$

$$\frac{\partial L}{\partial b(0)} = \frac{e^{-Y}+e^{-Z}}{(1+e^{-Y})(1+e^{-Z})}\cdot\frac{e^{-X}}{(1+e^{-X})^2} - \frac{1}{W_B} \cancel{+\lambda_X} = 0$$

$b(-\frac{1}{2})=0$

$$\frac{e^{-X}+e^{-Z}}{(1+e^{-X})(1+e^{-Z})}\cdot\frac{e^{-Y}}{(1+e^{-Y})^2} - \frac{1}{W_B} \cancel{\lambda_X} = 0$$

Can do same logic w/ these 2 eqns as on pg 10 of notes (there I did it w/ Z and Y)

$$e^{-Z} = e^{-X-Y}$$

$$-Z = -X - Y$$

$$Z = X + Y$$

$$-\frac{\beta}{2} - \cancel{\alpha} + b(\tfrac{0}{2}) = -\cancel{\alpha} + b(0) + \frac{\beta}{2}\alpha + b(\tfrac{1}{2})$$

$$0 = b(0) + b(\tfrac{1}{2}) + \beta - \alpha$$

$$\alpha - \beta = b(0) + b(\tfrac{1}{2})$$

$$\frac{\beta}{2} + \alpha + 0 = \alpha - b(0) - \frac{\beta}{2} + \alpha - b(\tfrac{1}{2})$$

$$\beta - \alpha =$$

DOES NOT MAKE SENSE

$$\frac{}{5} = b(0) - b(\tfrac{1}{2})$$

$\left\{ e^{-Z} - 1 \right\}$

if don't bribe $-\frac{1}{2}$, Z always neg.

$-Z$ always pos.

$e^{-Z} < 1$ for $-Z > 0$

take cross partial $\frac{\partial F}{\partial Z} = W_B \frac{e^{-Z}}{(1-e^{-Z})^2}\left[\frac{e^{-X}+e^{-Y}}{(1+e^{-X})(1+e^{-Y})}\right] - 1$

$$\frac{\partial F}{\partial Z \partial X} = \underbrace{W_B \frac{e^{-Z}}{(1-e^{-Z})^2}}_{\text{pdf so } >0}\left[\frac{(1+e^{-X})(1+e^{-Y})(-1)e^{-X} + (e^{-X}+e^{-Y})(1+e^{-Y})e^{-X}}{\left[(1+e^{-X})(1+e^{-Y})\right]^2}\right]$$

$$(1+e^{-X})e^{-X}\left[e^{-X} + e^{-Y} - 1 - e^{-Y}\right]$$

$$\left\{e^{-X} - 1\right\}$$

Y, X were negative $\quad e^{-X} > 1 \quad e^{-X} - 1 > 0$