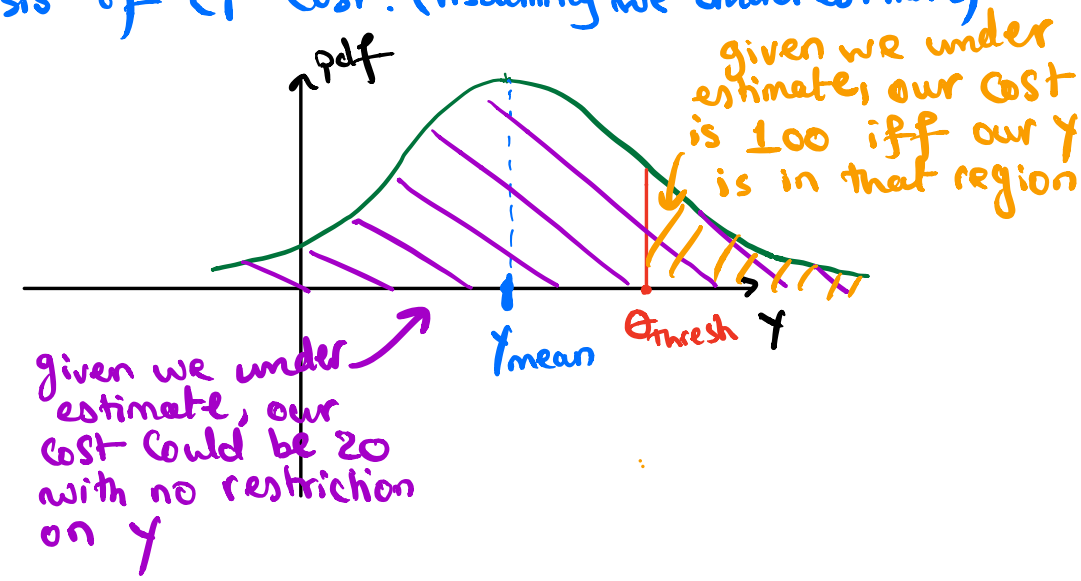
- Asymmetric cost prediction adjustment:

$$y^* = \hat{w}^T x + \sigma \, \Phi^{-1}\left(\frac{C_1}{C_1 + C_2}\right)$$

C_1 = Cost of underestimation ($C_1 = 20$ or 100)

C_2 = Cost of overestimation ($C_2 = 1$)

Analysis of C_1 Cost: (Assuming we underestimate)



$$\rightarrow C_1 = \frac{P(y > \theta_{thresh}) \cdot 100 + 1 \cdot 20}{P(y > \theta_{thresh}) + 1}$$

where $P(y > \theta_{thresh}) = 1 - \Phi\left(\frac{0.5 - y_{mean}}{\sigma_y}\right)$

Therefore, for each point in our test set, we calculate a different C_1, and adjust the prediction accordingly.