$$\therefore\ R(\alpha_i|w_j) = \lambda_s (1 - P(w_i|x)) \rightarrow (4)$$

Similarly for $i = c+1$

$$R(\alpha_i|w_j) = \lambda_{ij} = \lambda_r \rightarrow (5)$$

To ~~maximize~~ minimize $R(\alpha_i|w_j)$, $[1 - P(w_i|x)]$ needs to be really small. That means we need to maximize $P(w_i|x)$

So the minimum risk is achieved by taking:

$$R(\alpha_i|x) \leq R(\alpha_{c+1}|x)$$

$$\therefore\ \lambda_s (1 - P(w_i|x)) \leq \lambda_r$$

$$\therefore\ 1 - P(w_i|x) \leq \frac{\lambda_r}{\lambda_s}$$

$$\therefore\ \boxed{P(w_i|x) \geq 1 - \frac{\lambda_r}{\lambda_s}}$$

Also, If $R(\alpha_i|x) \leq R(\alpha_{c+1}, x)$, & $\lambda = 0$ for $i = j$,

then $\boxed{P(w_i|x) \geq P(w_j|x)}$

→ CASE 1 : $\lambda_r = 0$

For case where Rejection Loss is 0 :-

$$1 - \frac{\lambda_r}{\lambda_s} \leq P(\omega_i | x)$$

$$1 - \frac{0}{\lambda_s} \leq P(\omega_i | x)$$

$$\Rightarrow P(\omega_i | x) \geq 1$$

i.e. we take i as $c+1$; or, that we reject the class as Rejection leads to 0 Loss and higher probability.

→ CASE 2 : $\lambda_r > \lambda_s$

When $\lambda_r > \lambda_s$, then $\lambda_r / \lambda_s > 1$

$\Rightarrow 1 - \frac{\lambda_r}{\lambda_s}$ is negative $\therefore P(\omega_i | x) \geq$ (negative)

i.e. Rejection Loss is greater than substitution loss, so we don't reject.