Se parte del modelo de clasificación cuadrático

$$R(x) = -\frac{1}{2}(x-\mu_A)^T \Sigma_A^{-1}(x-\mu_A) + \frac{1}{2}(x-\mu_B)^T \Sigma_B^{-1}(x-\mu_A)$$
$$-\frac{1}{2}\log(|\Sigma_A|) + \frac{1}{2}\log(|\Sigma_B|) - \log(P(B)/P(A))$$

Clasificador LINEAL

Si $\Sigma_A = \Sigma_B = \Sigma$ → cuadrático

$$R(x) = -\frac{1}{2}(x-\mu_A)^T \Sigma^{-1}(x-\mu_A) + \frac{1}{2}(x-\mu_B)^T \Sigma^{-1}(x-\mu_B) + Cte$$

$$R(x) = \frac{1}{2}\left[-x^T\Sigma^{-1}x + x^T\Sigma^{-1}\mu_A + \mu_A^T\Sigma^{-1}x - \mu_A^T\Sigma^{-1}\mu_A + x^T\Sigma^{-1}x - x^T\Sigma^{-1}\mu_B - \mu_B^T\Sigma^{-1}x + \mu_B^T\Sigma^{-1}\mu_B\right] + Cte$$

$$R(x) = \frac{1}{2}\left[2\mu_A^T\Sigma^{-1}x - 2\mu_B^T\Sigma^{-1}x - \mu_A^T\Sigma^{-1}\mu_A + \mu_B^T\Sigma^{-1}\mu_B\right] + Cte$$

$$R(x) = \frac{1}{2}\left[2[\mu_A-\mu_B]^T\Sigma^{-1}x - \mu_A^T\Sigma^{-1}\mu_A + \mu_B^T\Sigma^{-1}\mu_B\right] + Cte$$

$$\boxed{R(x) = [\mu_A-\mu_B]^T\Sigma^{-1}x - \underbrace{\frac{1}{2}\mu_A^T\Sigma^{-1}\mu_A + \mu_B^T\Sigma^{-1}\mu_B + Ck}_{Cte.}}$$

$$R(x) = \frac{1}{2\sigma^2}\left(-x^T x + x^T \mu_A + \mu_A^T x - \mu_A^T \mu_A + x^T x - x^T \mu_B - \mu_B^T x + \mu_B^T \mu_B\right) + ctte$$

$$R(x) = \frac{1}{2\sigma^2}\left(2\mu_A^T x - 2\mu_B^T x\right) + ctte$$

↓

Luego

$$R(x) = \frac{1}{2\sigma^2}\left(2\mu_A^T x - 2\mu_B^T x\right) + etc.$$

$$R(x) = \frac{1}{\sigma^2}(\mu_A - \mu_B)^T x + etc.$$