

Achromatic receptor-response function

$$Q_{ab}[x_r/a'] \quad a' = a \ln(10)$$

with $x_r = \log [L/L_u]$ (L = test luminance)

L_u = surround luminance

$$Q_{ab}[x_r/a'] = \frac{b}{\ln \sqrt{2}} \ln \left[\frac{1}{1 + \sqrt{2} 10^{(x_r/a')}} \right] - b$$

function values for $b=1$ and $a' = a \ln(10) > 0$:

$$Q_{a1}[x_r/a' \rightarrow -\infty] = -1 \quad x = \log L, \quad u = \log L_u$$

$$Q_{a1}[x_r/a' = 0] = 0 \quad x_r = \log [L/L_u]$$

$$Q_{a1}[x_r/a' \rightarrow +\infty] = +1 \quad = x - u$$