Achromatic receptor-response function

$F_{ab}[x_r/a]$ x_r=log(relative luminance)

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

L_u=surround luminance

$$F_{ab}[x_r/a] = b\,\frac{e^{x_r/a} - e^{-x_r/a}}{e^{x_r/a} + e^{-x_r/a}} = b \tanh [x_r/a]$$

function values for b=1 and a>0 :

$F_{a1}[x_r/a \to -\infty] = -1$

$F_{a1}[x_r/a = 0] = 0$

$F_{a1}[x_r/a \to +\infty] = +1$

$x = \log L$, $u = \log L_u$

$x_r = \log [L/L_u] = x - u$