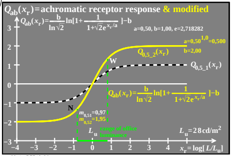
http://farbe.li.tu-berlin.de/eeo2/eeo2l0n1.txt /.ps; only vector graphic VG; start output
see similar files: http://farbe.li.tu-berlin.de/eeo2/eeo2.htm



eeo20−1n, DEB10−2A

Achromatic receptor-response function
$Q_{ab}[x_r/a]$

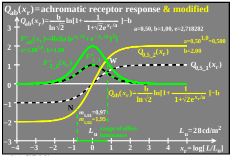
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

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

function values for b=1 and a>0 :

$Q_{a1}[x_r/a\to-\infty] = -1$ $\quad x$=log$L$, u=logL_u
$Q_{a1}[x_r/a = 0] = 0$ $\quad x_r$=log [L/L_u]
$Q_{a1}[x_r/a\to+\infty] = +1$ $\quad = x - u$

eeo20−2n



eeo21−1n, DNB40−2A

Derivation of achromatic receptor response
$F'_{ab}[x_r/a]$ x_r=log(relative luminance)

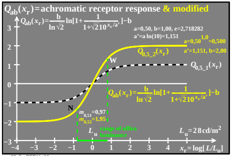
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

$$F'_{ab}[x_r/a] = \frac{4b}{a\{e^{x_r/a}+e^{-x_r/a}\}^2} = \frac{b}{a\sinh^2[x_r/a]}$$

function values for b=1 and a>0 :

$F'_{a1}[x_r/a\to-\infty] = 0$ $\quad x$=log$L$, u=logL_u
$F'_{a1}[x_r/a=1] = 1$ $\quad x_r$=log [L/L_u]
$F'_{a1}[x_r/a\to+\infty] = 0$ $\quad = x - u$

eeo21−2n



eeo20−3n, DEB11−2A

Achromatic receptor-response function
$Q_{ab}[x_r/a']$ $\quad$ a'=a ln(10)

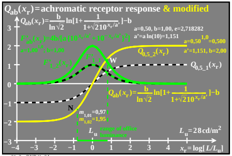
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

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

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

$Q_{a1}[x_r/a'\to-\infty] = -1$ $\quad x$=log$L$, u=logL_u
$Q_{a1}[x_r/a' = 0] = 0$ $\quad x_r$=log [L/L_u]
$Q_{a1}[x_r/a'\to+\infty] = +1$ $\quad = x - u$

eeo20−4n



eeo21−3n, DNB41−2A

Derivation of achromatic receptor response
$F'_{ab}[x_r/a]$ x_r=log(relative luminance)

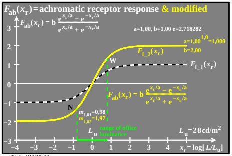
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

$$F'_{ab}[x_r/a] = \frac{4b}{a'\{10^{x_r/a'}+10^{-x_r/a'}\}^2} = \frac{b}{a'\sinh^2[x_r/a']}$$

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

$F'_{a1}[x_r/a'\to-\infty] = 0$ $\quad x$=log$L$, u=logL_u
$F'_{a1}[x_r/a'=1] = 1$ $\quad x_r$=log [L/L_u]
$F'_{a1}[x_r/a'\to+\infty] = 0$ $\quad = x - u$

eeo21−4n



eeo20−5n, DNC10−2A

Achromatic receptor-response function
$F_{ab}[x_r/a]$ $\quad x_r$=log(relative luminance)

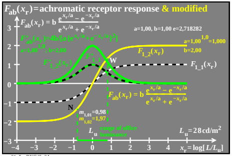
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

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

function values for b=1 and a>0 :

$F_{a1}[x_r/a\to-\infty] = -1$ $\quad x$=log$L$, u=logL_u
$F_{a1}[x_r/a = 0] = 0$ $\quad x_r$=log [L/L_u]
$F_{a1}[x_r/a\to+\infty] = +1$ $\quad = x - u$

eeo20−6n



eeo21−5n, DNC40−2A

Derivation of achromatic receptor response
$F'_{ab}[x_r/a]$ x_r=log(relative luminance)

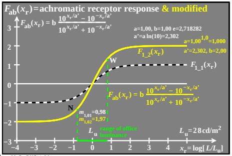
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

$$F'_{ab}[x_r/a] = \frac{4b}{a\{e^{x_r/a}+e^{-x_r/a}\}^2} = \frac{b}{a\sinh^2[x_r/a]}$$

function values for b=1 and a>0 :

$F'_{a1}[x_r/a\to-\infty] = 0$ $\quad x$=log$L$, u=logL_u
$F'_{a1}[x_r/a=1] = 1$ $\quad x_r$=log [L/L_u]
$F'_{a1}[x_r/a\to+\infty] = 0$ $\quad = x - u$

eeo21−6n



eeo20−7n, DNC11−2A

Achromatic receptor-response function
$F_{ab}[x_r/a']$ $\quad x_r$=log(relative luminance)

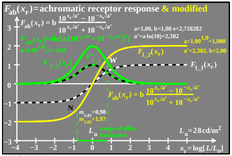
with x_r=log [L/L_u] (L=test luminance)
L_u=surround luminance

$$F_{ab}[x_r/a'] = b\,\frac{10^{x_r/a'}-10^{-x_r/a'}}{10^{x_r/a'}+10^{-x_r/a'}} = b\tanh[x_r/a']$$

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

$F_{a1}[x_r/a'\to-\infty] = -1$ $\quad x$=log$L$, u=logL_u
$F_{a1}[x_r/a' = 0] = 0$ $\quad x_r$=log [L/L_u]
$F_{a1}[x_r/a'\to+\infty] = +1$ $\quad = x - u$

eeo20−8n



eeo21−7n, DNC41−2A

Derivation of achromatic receptor response
$F'_{ab}[x_r/a]$ x_r=log(relative luminance)

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

$$F'_{ab}[x_r/a] = \frac{4b}{a'\{10^{x_r/a'}+10^{-x_r/a'}\}^2} = \frac{b}{a'\sinh^2[x_r/a']}$$

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

$F'_{a1}[x_r/a'\to-\infty] = 0$ $\quad x$=log$L$, u=logL_u
$F'_{a1}[x_r/a'=1] = 1$ $\quad x_r$=log [L/L_u]
$F'_{a1}[x_r/a'\to+\infty] = 0$ $\quad = x - u$

eeo21−8n

TUB-test chart eeo2; Model of two response functions $F_{ab}(x_r)$ & $Q_{ab}(x_r)$ and derivation $F'_{ab}(x_r)$
Tangens hyperbolicus $\tanh(x_r)$ and modified functions with e^{x_r} and 10^{x_r}; $a^n = a^{1,0}$

see similar files of the whole serie: http://farbe.li.tu-berlin.de/eeos.htm
technical information: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

TUB registration: 20230701-eeo2/eeo2l0n1.txt /.ps
application for evaluation and measurement of display or print output

TUB material: code=rha4ta