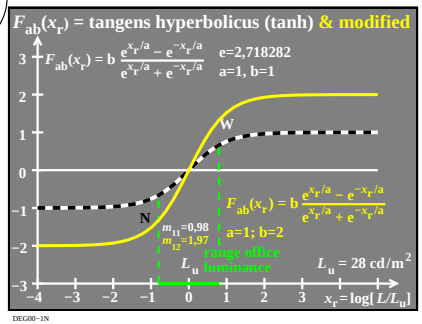
see similar files: http://farbe.li.tu-berlin.de/DEG0/DEG0.HTM
technical information: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

TUB registration: 20210901-DEG0/DEG0L0NP.PDF /.PS
application for evaluation and measurement of display or print output
TUB material: code=rha4ta

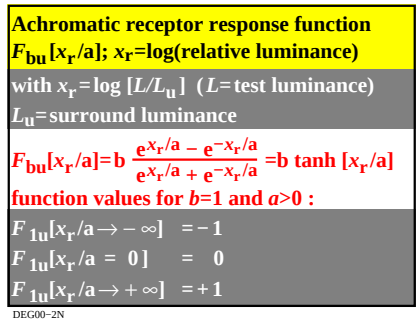


Achromatic receptor response function
$F_{bu}[x_r/a]$; x_r=log(relative luminance)

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

$F_{bu}[x_r/a] = b\,\frac{e^{x_r/a} - e^{-x_r/a}}{e^{x_r/a} + e^{-x_r/a}} = b \tanh [x_r/a]$
function values for b=1 and a>0 :

$F_{1u}[x_r/a \to -\infty] = -1$
$F_{1u}[x_r/a = 0] = 0$
$F_{1u}[x_r/a \to +\infty] = +1$

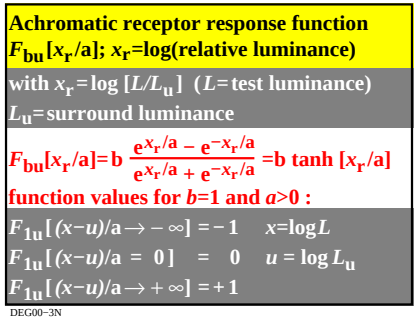


Achromatic receptor response function
$F_{bu}[x_r/a]$; x_r=log(relative luminance)

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

$F_{bu}[x_r/a] = b\,\frac{e^{x_r/a} - e^{-x_r/a}}{e^{x_r/a} + e^{-x_r/a}} = b \tanh [x_r/a]$
function values for b=1 and a>0 :

$F_{1u}[(x-u)/a \to -\infty] = -1$ $x = \log L$
$F_{1u}[(x-u)/a = 0] = 0$ $u = \log L_u$
$F_{1u}[(x-u)/a \to +\infty] = +1$

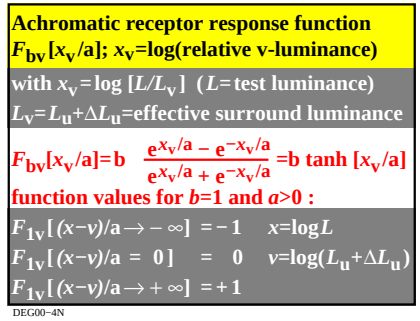


Achromatic receptor response function
$F_{bv}[x_v/a]$; x_v=log(relative v-luminance)

with $x_v = \log [L/L_v]$ (L=test luminance)
$L_v = L_u + \Delta L_u$=effective surround luminance

$F_{bv}[x_v/a] = b\,\frac{e^{x_v/a} - e^{-x_v/a}}{e^{x_v/a} + e^{-x_v/a}} = b \tanh [x_v/a]$
function values for b=1 and a>0 :

$F_{1v}[(x-v)/a \to -\infty] = -1$ $x = \log L$
$F_{1v}[(x-v)/a = 0] = 0$ $v = \log(L_u + \Delta L_u)$
$F_{1v}[(x-v)/a \to +\infty] = +1$

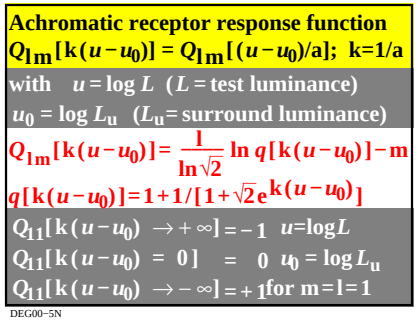


Achromatic receptor response function
$Q_{lm}[k(u-u_0)] = Q_{lm}[(u-u_0)/a]$; k=1/a

with $u = \log L$ (L = test luminance)
$u_0 = \log L_u$ (L_u= surround luminance)

$Q_{lm}[k(u-u_0)] = \frac{l}{\ln\sqrt{2}} \ln q[k(u-u_0)] - m$
$q[k(u-u_0)] = 1 + 1/[1 + \sqrt{2}\,e^{k(u-u_0)}]$

$Q_{11}[k(u-u_0) \to +\infty] = -1$ $u = \log L$
$Q_{11}[k(u-u_0) = 0] = 0$ $u_0 = \log L_u$
$Q_{11}[k(u-u_0) \to -\infty] = +1$ for m=l=1

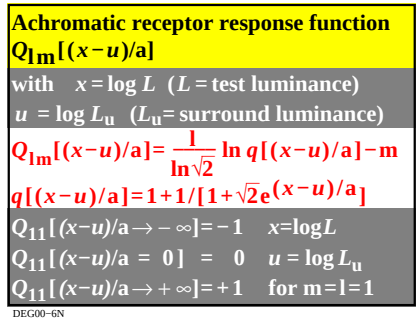


Achromatic receptor response function
$Q_{lm}[(x-u)/a]$

with $x = \log L$ (L = test luminance)
$u = \log L_u$ (L_u= surround luminance)

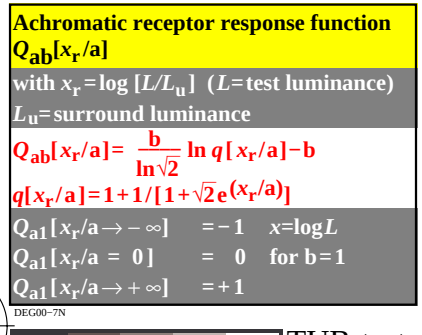
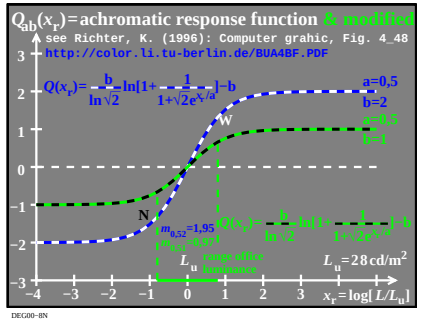
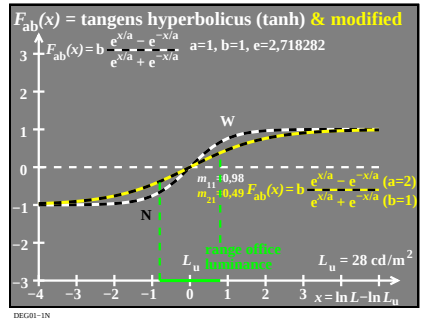
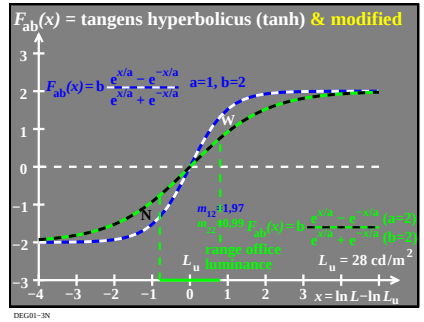
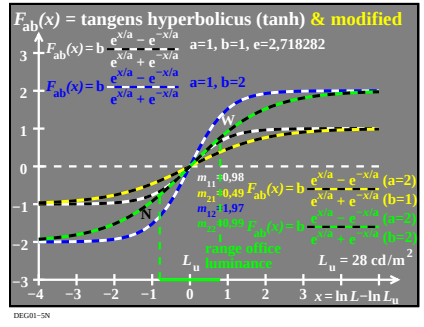
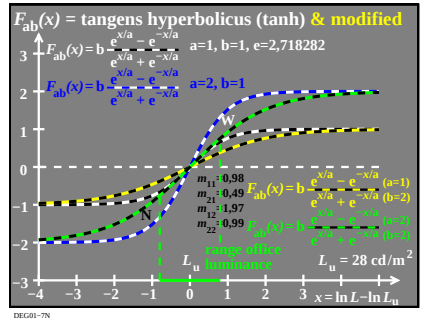
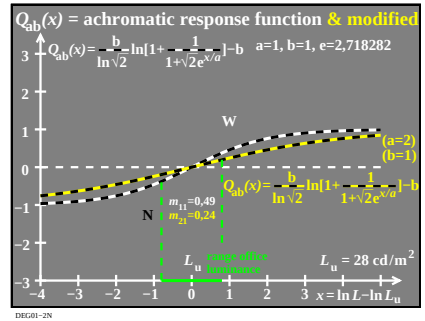
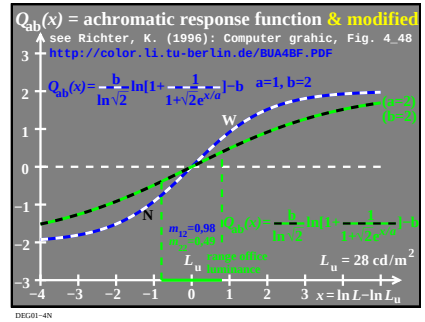
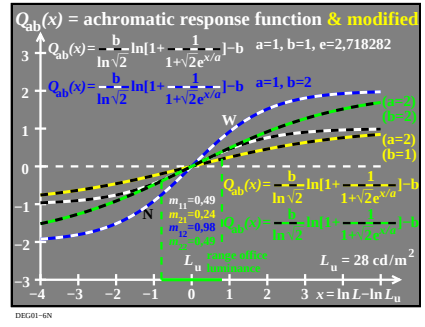
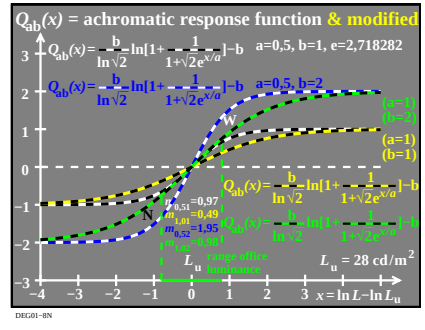
$Q_{lm}[(x-u)/a] = \frac{l}{\ln\sqrt{2}} \ln q[(x-u)/a] - m$
$q[(x-u)/a] = 1 + 1/[1 + \sqrt{2}\,e^{(x-u)/a}]$

$Q_{11}[(x-u)/a \to -\infty] = -1$ $x = \log L$
$Q_{11}[(x-u)/a = 0] = 0$ $u = \log L_u$
$Q_{11}[(x-u)/a \to +\infty] = +1$ for m=l=1



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

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

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

$Q_{a1}[x_r/a \to -\infty] = -1$ $x = \log L$
$Q_{a1}[x_r/a = 0] = 0$ for b=1
$Q_{a1}[x_r/a \to +\infty] = +1$