



<http://130.149.60.45/~farbmetrik/UE14/UE14L0NA.TXT>/.PS; start output

N: no 3D-linearization (OL) in file (F) or PS-startup (S), page 1/1

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see similar files: <http://130.149.60.45/~fan/>
technical information: <http://www.ps.bam>

[rbmetrik/UE14/UE14.HTM](http://130.149.60.45/~fbm/UE14/UE14.HTM)
[.de or <http://130.149.60.45/~fbm>](http://130.149.60.45/~fbm.de)

arbmetri

TUB registration: 20130201-UE14/UE14LON/
application for measurement of display output

TUB material: code=rha4ta

Hyperbolic response function of achromatic vision space T^*_{HYP3}

nonlinear color terms	name and relationship with test field luminance L	notes
threshold sum T^*_{HYP3}	$T^*_{\text{HYP3}} = A_1 \cdot L^t / (L^t + A_2); \quad X = L^t$ $= A_1 \cdot X / (X + A_2); \quad dX/dL = t \cdot X^{t-1}$ alternative: $A_2 = A_{2X}^t$	<i>T. Seim 2014:</i> exponent: $t = 0,8$ for presentation time: $t_p = 0,1\text{s}$ of <i>Avramopoulos</i> experiments 1989
CIE luminance contrast sensitivity threshold L / dL	$dT^*_{\text{HYP3}} / dX = A_1 \cdot A_2 / (X + A_2)^2$ $dT^*_{\text{HYP3}} / dL = dT^*_{\text{HYP3}} / dX \cdot dX / dL$ $dT^*_{\text{HYP3}} / dL = A_1 \cdot A_2 \cdot t \cdot X^{t-1} / (X + A_2)^2$ for $dT^*_{\text{HYP3}} = 1$, and multiplication with L : $L / dL = A_1 \cdot A_2 \cdot t \cdot X / (X + A_2)^2$ $= A_1 \cdot A_2 \cdot t \cdot L^t / (L^t + A_2)^2$	Hyperbolic function: $T^*_{\text{max}} = A_1$ $T^*_{\text{average}} = 0,5 \cdot A_1$ $A_{2X} = A_2^{1/t}$
CIE luminance difference threshold dL	$dL = L \cdot (L^t + A_2)^2 / (A_1 \cdot A_2 \cdot t \cdot L^t)$ $= (L^t + A_2)^2 / (A_1 \cdot A_2 \cdot t \cdot L^{t-1})$	

1-000030-L0

UE140-3N

Potential response function of achromatic vision space T^*_{POT4}

nonlinear color terms	name and relationship with test field luminance L	notes
threshold sum T^*_{POT4}	$T^*_{\text{POT4}} = A_0 \cdot [(A_1 + A_3 \cdot L)^n - 1]; X = A_1 + A_3 \cdot L$ $= A_0 \cdot [X^n - 1]; dX/dL = A_3$ $= V \cdot (L_s/s)^n \cdot [(1 - s + s \cdot L / L_s)^n - 1]$	K. Richter 1988: exponent: $n = -0.25$ or: $t = 1 - n = 1.25$ for presentation time: $t_p = 0.4s$ (<i>Lingelbach experiments 1977</i>)
CIE luminance contrast sensitivity threshold L / dL	$dT^*_{\text{POT4}} / dX = A_0 \cdot n \cdot X^{n-1}$ $dT^*_{\text{POT4}} / dL = dT^*_{\text{POT4}} / dX \cdot dX / dL$ $dT^*_{\text{POT4}} / dL = A_0 \cdot n \cdot X^{n-1} \cdot A_3$ $\text{for } dT^*_{\text{POT4}} = 1, \text{ and multiplication with } L:$ $L / dL = A_0 \cdot L \cdot n \cdot A_3 \cdot X^{n-1}$ $= A_0 \cdot L \cdot n \cdot A_3 \cdot [A_1 + A_3 L]^{n-1}$	threshold data s, L_s : $s = 1 - A_1$ $L_s = (1 - A_1) / A_3$ $V = A_0 \cdot (L_s/s)^n$ $s = 1/[1+(n V L^n)^{1/(n-1)}]$ for large L : $T^*_{\text{POT4}} = V \cdot L^n$ for least square fit: $dX/dA1 = 1$ $dX/dA3 = L$ $dX/dL = A_3$
CIE luminance difference threshold dL	$dL = 1 / (A_0 \cdot n \cdot A_3 \cdot X^{n-1})$ $= A_4 \cdot (A_1 + A_3 L)^t; A_4 = 1/(A_0 \cdot n \cdot A_3)$	

1-000030-L0

UE140-7N

Potential response function of achromatic vision space T^*_{POT3}

nonlinear color terms	name and relationship with test field luminance L	notes
threshold sum $*_{\text{POT3}}$	$T^*_{\text{POT3}} = A_1 \cdot [(1 + A_3 \cdot L)^t - 1]; X = 1 + A_3 \cdot L$ $= A_1 \cdot [X^t - 1]; dX/dL = A_3$ $= ??$	K. Richter 1988; exponent: $t = -0,25$ for presentation time: $t_p = 0,1s$ (Lingelbach experiments 1977)
TIE luminance contrast sensitivity threshold $/dL$	$dT^*_{\text{POT3}} / dX = A_1 \cdot t \cdot X^{t-1}$ $dT^*_{\text{POT3}} / dL = dT^*_{\text{POT3}} / dX \cdot dX / dL$ $dT^*_{\text{POT3}} / dL = A_1 \cdot t \cdot X^{t-1} \cdot A_3$ <p>for $dT^*_{\text{POT3}} = 1$, and multiplication with L:</p> $L / dL = A_1 \cdot L \cdot t \cdot A_3 \cdot X^{t-1}$ $= A_1 \cdot L \cdot t \cdot A_3 \cdot [1 + A_3 L]^{t-1}$	for large L : $T^*_{\text{POT3}} = A_1 \cdot A_3 \cdot L^t$ <p>for least square fit:</p> $dX/dA_3 = 1$ $dX/dL = A_3$
TIE luminance difference threshold dL	$dL = 1 / (A_1 \cdot t \cdot A_3 \cdot X^{t-1})$ $= 1 / (A_1 \cdot t \cdot A_3 \cdot [1 + A_3 \cdot L]^{t-1})$	

000030-L0

UE141-3M

Potential response function of achromatic vision space T^*POT4

nonlinear color terms	name and relationship with test field luminance L	notes
threshold sum * POT4	$T^*_{\text{POT4}} = A_4 \cdot [(A_1 + A_3 \cdot L)^t - 1]; X = A_1 + A_3 \cdot L$ $= A_4 \cdot [X^t - 1]; dX/dL = A_3$ $= V \cdot (L_s/s)^t \cdot [(1 - s + s \cdot L / L_s)^t - 1]$	K. Richter 1988; exponent: $t = -0,25$ or: $n = 1 - t = 1,25$ for presentation time: $t_p = 0,4s$ (Lingelbach experiments 1977)
IE luminance contrast sensitivity threshold / dL	$dT^*_{\text{POT4}} / dX = A_4 \cdot t \cdot X^{t-1}$ $dT^*_{\text{POT4}} / dL = dT^*_{\text{POT4}} / dX \cdot dX / dL$ $dT^*_{\text{POT4}} / dL = A_4 \cdot t \cdot X^{t-1} \cdot A_3$ <p>for $dT^*_{\text{POT4}} = 1$, and multiplication with L:</p> $L / dL = A_4 \cdot L \cdot t \cdot A_3 \cdot X^{t-1}$ $= A_4 \cdot L \cdot t \cdot A_3 \cdot [A_1 + A_3 L]^{t-1}$	threshold data s, L_s ; $s = 1 - A_1$ $L_s = (1 - A_1) / A_3$ $V = A_4 \cdot (L_s/s)^t$ $s = 1/[1+(t \cdot V \cdot L)^{1/(1-t)}]$ for large L : $T^*_{\text{POT4}} = V \cdot L^t$ for least square fit:
IE luminance difference threshold dL	$dL = 1 / (A_4 \cdot t \cdot A_3 \cdot X^{t-1})$ $= (A_1 + A_3 L)^n / (A_4 \cdot t \cdot A_3)$	$dX/dA1 = 1$ $dX/dA3 = L$ $dX/dL = A_3$

000030-L0

UE1410-7

TUB-test chart UE14; Colour thresholds spaces *LABJNDs* 1985, and 3 modifications 2014

input: w/rgb/cmyk -> w/rgb/cmyk_
output: no change