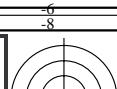


6

-6

V L O Y M C
<http://farbe.li.tu-berlin.de/hex1/hex10na.txt> /ps; only vector graphic VG; start output
 see similar files: <http://farbe.li.tu-berlin.de/hex1/hex1.htm>



C
M
Y
Y
O
M
L
V

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

LABJND colour-difference formula of CIE 230:2019
Main integral equations with Y and Y_u of surround u

$dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $dY_r = A_1[1+A_{2u}Y_r] \quad A_1=0,0170, A_{2u}=5,931, Y_r=(Y/Y_u) \quad [6d]$ $\frac{1}{A_1} \int \frac{dY}{1+A_2Y} = \frac{1}{A_1A_2} \ln 1+A_2Y = F^*(Y) \quad (A_3=1) \quad [5i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $dY_r = A_1[1+A_{2u}(Y_r)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY}{1+A_2Y} = \frac{1}{A_1} \frac{[1+A_2Y]^{(A_3+1)}}{A_2(A_3+1)} = F^*(Y) \quad (A_3=1) \quad [7i]$	$dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $dY_r = A_1[1+A_{2u}Y_r] \quad A_1=0,0170, A_{2u}=5,931, Y_r=(Y/Y_u) \quad [6d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_{2u}Y_r} = \frac{1}{A_1A_{2u}} \ln 1+A_{2u}Y_r = F^*(Y_r) \quad (A_3=1) \quad [6i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $dY_r = A_1[1+A_{2u}(Y_r)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_{2u}Y_r} = \frac{1}{A_1} \frac{[1+A_{2u}Y_r]^{(A_3+1)}}{A_{2u}(A_3+1)} = F^*(Y_r) \quad (A_3=1) \quad [8i]$
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hex10-1n hex10-2n

LABJND colour-difference formula of CIE 230:2019
Modifications with normalization to Y_u of surround

$dY = A_1+A_2Y \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,0058 \quad [1]$ $= A_1+A_{2u}(Y/Y_u) \quad A_1=0,0170, A_{2u}=0,1004=A_2Y_u \quad [2]$ $dY = A_1+A_2Y^{A_3} \quad \text{error } 0,0019 \quad A_1=0,0258, A_2=0,0036, A_3=1,087 \quad [3]$ $= A_1+A_{2u}(Y/Y_u)^{A_3} \quad A_1=0,0258, A_{2u}=0,0823, A_3=1,087 \quad [4]$ $dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5]$ $= A_1[1+A_{2u}(Y/Y_u)] \quad A_1=0,0170, A_{2u}=5,931=A_2Y_u \quad [6]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7]$ $= A_1[1+A_{2u}(Y/Y_u)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8]$	$dY = A_1+A_2Y \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,0058 \quad [1d]$ $= A_1+A_{2u}(Y/Y_u) \quad A_1=0,0170, A_{2u}=0,1004=A_2Y_u \quad [2d]$ $\int \frac{dY_r}{A_1+A_2Y} = \frac{1}{A_2} \ln A_1+A_2Y_r = F^*(Y_r) \quad (A_3=1) \quad [1i]$ $dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $= A_1[1+A_{2u}(Y/Y_u)] \quad A_1=0,0170, A_{2u}=5,931=A_2Y_u \quad [6d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_2Y} = \frac{1}{A_1A_2} \ln 1+A_2Y_r = F^*(Y_r) \quad (A_3=1) \quad [5i]$
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hex10-3n DEQ30-3N hex10-4n DEQ30-4N

LABJND colour-difference formula of CIE 230:2019
Modifications with normalization to Y_u of surround

$dY = A_1+A_2Y \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,0058 \quad [1d]$ $dY_r = A_1+A_{2u}Y_r \quad A_1=0,0170, A_{2u}=0,1004, Y_r=(Y/Y_u) \quad [2d]$ $\int \frac{dY_r}{A_1+A_2Y_r} = \frac{1}{A_2} \ln A_1+A_2Y_r = F^*(Y_r) \quad (A_3=1) \quad [2i]$ $dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $dY_r = A_1[1+A_{2u}Y_r] \quad A_1=0,0170, A_{2u}=5,931, Y_r=(Y/Y_u) \quad [6d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_2Y_r} = \frac{1}{A_1A_{2u}} \ln 1+A_{2u}Y_r = F^*(Y_r) \quad (A_3=1) \quad [6i]$	$dY = A_1+A_2Y^{A_3} \quad \text{error } 0,0019 \quad A_1=0,0258, A_2=0,0036, A_3=1,087 \quad [3d]$ $= A_1+A_{2u}(Y/Y_u)^{A_3} \quad A_1=0,0258, A_{2u}=0,0826, A_3=1,087 \quad [4d]$ $\int \frac{dY_r}{A_1+A_2Y_r} = A_1Y_r + \frac{A_2[Y_r]^{(A_3+1)}}{A_3+1} = F^*(Y_r) \quad (A_3=1) \quad [3i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $= A_1[1+A_{2u}(Y/Y_u)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_2Y_r} = \frac{1}{A_1} \frac{[1+A_2Y_r]^{(A_3+1)}}{A_2(A_3+1)} = F^*(Y_r) \quad (A_3=1) \quad [7i]$
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hex10-5n DEQ30-5N hex10-6n DEQ30-6N

LABJND colour-difference formula of CIE 230:2019
Modifications with normalization to Y_u of surround

$dY = [A_1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0358, A_2=0,00561, A_3=1,107 \quad [9d]$ $= [A_1+A_{2u}(Y/Y_u)]^{A_3} \quad A_1=0,0358, A_{2u}=0,0995, A_3=1,107 \quad [10d]$ $\int \frac{dY}{(A_1+A_2Y)^{A_3}} = \frac{[A_1+A_2Y]^{(A_3+1)}}{A_2(A_3+1)} = F^*(Y) \quad A_3 \neq 1 \quad [9i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $= A_1[1+A_{2u}(Y/Y_u)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY}{1+[A_2Y]^{A_3}} = \frac{1}{A_1} \frac{[1+A_2Y]^{(A_3+1)}}{A_2(A_3+1)} = F^*(Y) \quad A_3 \neq 1 \quad [7i]$	$dY = A_1+A_2Y^{A_3} \quad \text{error } 0,0019 \quad A_1=0,0258, A_2=0,0036, A_3=1,087 \quad [3d]$ $= A_1+A_{2u}(Y/Y_u)^{A_3} \quad A_1=0,0258, A_{2u}=0,0823, A_3=1,087 \quad [4d]$ $\int \frac{dY_r}{A_1+A_{2u}[Y_r]^{A_3}} = A_1Y_r + \frac{A_{2u}[Y_r]^{(A_3+1)}}{A_3+1} = F^*(Y_r) \quad (A_3=1) \quad [4i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $= A_1[1+A_{2u}(Y/Y_u)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+[A_{2u}Y_r]^{A_3}} = \frac{1}{A_1} \frac{[1+A_{2u}Y_r]^{(A_3+1)}}{A_{2u}(A_3+1)} = F^*(Y_r) \quad (A_3=1) \quad [8i]$
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hex10-7n DEQ30-7N hex10-8n DEQ30-8N

LABJND colour-difference formula of CIE 230:2019
Main integral equations with Y_r and Y_u of surround u

$dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $dY_r = A_1[1+A_{2u}Y_r] \quad A_1=0,0170, A_{2u}=5,931, Y_r=(Y/Y_u) \quad [6d]$ $\frac{1}{A_1} \int \frac{dY}{1+A_2Y} = \frac{1}{A_1A_2} \ln 1+A_2Y = F^*(Y) \quad (A_3=1) \quad [5i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $dY_r = A_1[1+A_{2u}(Y_r)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY}{1+A_2Y} = \frac{1}{A_1} \frac{[1+A_2Y]^{(A_3+1)}}{A_2(A_3+1)} = F^*(Y) \quad (A_3=1) \quad [7i]$	$dY = A_1[1+A_2Y] \quad \text{error } 0,0044 \quad A_1=0,0170, A_2=0,3343 \quad [5d]$ $dY_r = A_1[1+A_{2u}Y_r] \quad A_1=0,0170, A_{2u}=5,931, Y_r=(Y/Y_u) \quad [6d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_{2u}Y_r} = \frac{1}{A_1A_{2u}} \ln 1+A_{2u}Y_r = F^*(Y_r) \quad (A_3=1) \quad [6i]$ $dY = A_1[1+A_2Y]^{A_3} \quad \text{error } 0,0018 \quad A_1=0,0251, A_2=0,1566, A_3=1,107 \quad [7d]$ $dY_r = A_1[1+A_{2u}(Y_r)]^{A_3} \quad A_1=0,0251, A_{2u}=2,778, A_3=1,107 \quad [8d]$ $\frac{1}{A_1} \int \frac{dY_r}{1+A_{2u}Y_r} = \frac{1}{A_1} \frac{[1+A_{2u}Y_r]^{(A_3+1)}}{A_{2u}(A_3+1)} = F^*(Y_r) \quad (A_3=1) \quad [8i]$
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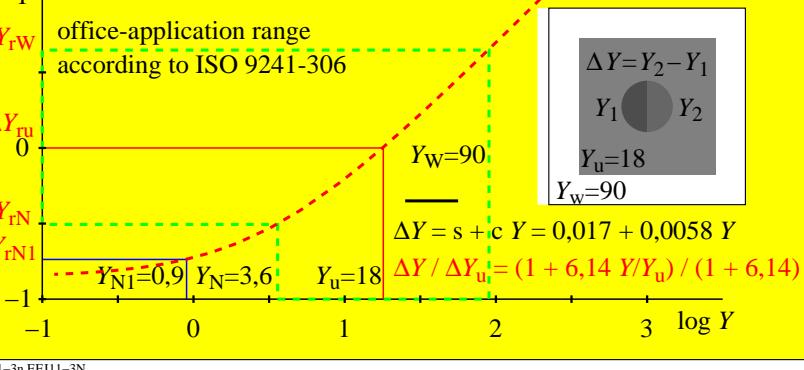
hex10-1n hex10-2n

Normalized NW-achromatic thresholds $\Delta Y_{ru} = \Delta Y / \Delta Y_u$ as function of Y

experiments and data: BAM-research report no. 115 (1985), page 72, see
 $\log[\Delta Y_{ru} = \Delta Y / \Delta Y_u]$ <https://nbn-resolving.org/urn:nbn:de:kobv:b43-3350>

↑ tristimulus value threshold ΔY , see LABJND in TR CIE 230:219
 Validity of Formulae for predicting Small Colour Differences

The performance of 8 datasets: http://files.cie.co.at/TC181_Datasets.zip is best for LABJND in 5 cases, for CIELAB & CMC & CIEDE2000 all in one case, see Table 9 and 11 for the range $0 \leq \Delta E_{ab}^* < 2$.

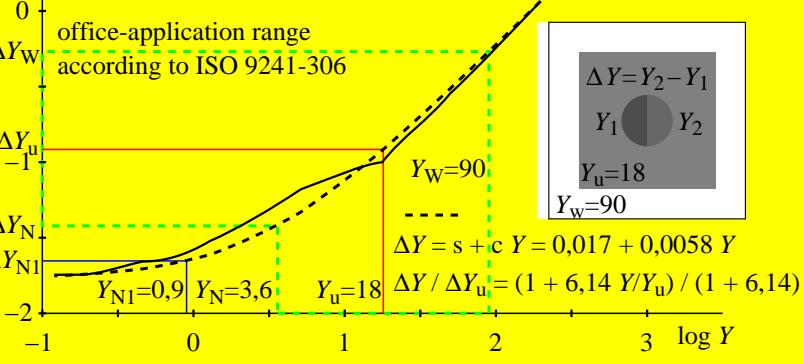


NW-achromatic thresholds ΔY as function of Y

experiments and data: BAM-research report no. 115 (1985), page 72, see
 $\log[\Delta Y]$ <https://nbn-resolving.org/urn:nbn:de:kobv:b43-3350>

↑ tristimulus value threshold ΔY , see LABJND in TR CIE 230:219
 Validity of Formulae for predicting Small Colour Differences

The performance of 8 datasets: http://files.cie.co.at/TC181_Datasets.zip is best for LABJND in 5 cases, for CIELAB & CMC & CIEDE2000 all in one case, see Table 9 and 11 for the range $0 \leq \Delta E_{ab}^* < 2$.



TUB-test chart hex1; CIE Y and lightness L^* for surface colours and for light-display colours
 Line-element optimization of the colour difference formula LABJND according to CIE 230:2019

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