

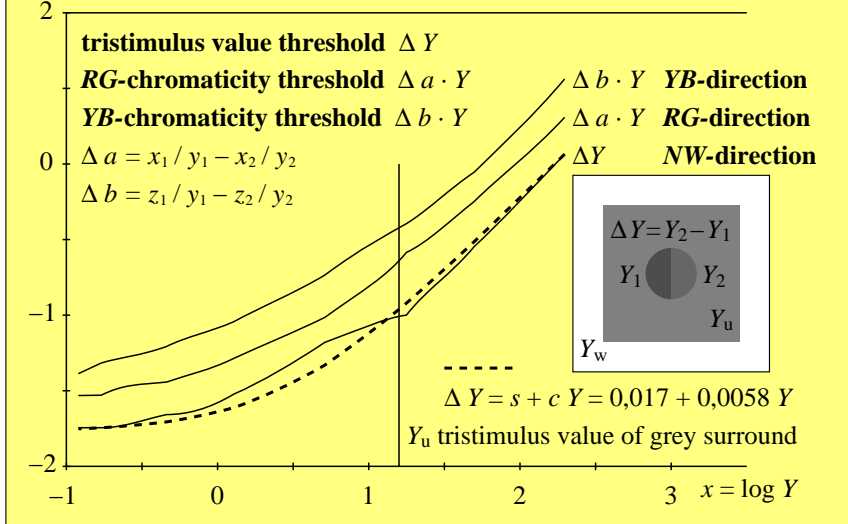
Achromatic colours, intermediate colours
five achromatic colours:
 N black (French noir)
 D dark grey
 Z central grey
 H light grey
 W white
two intermediate colours:
 C_e = G50B_e blue-green
 M_e = B50R_e blue-red

Chromatic colours, elementary colours
"neither-nor"-colours
four elementary (e) colours:
 R = R_e red
 G = G_e green
 B = B_e blue
 J = Y_e yellow (French jaune)
neither yellowish nor bluish
neither yellowish nor bluish
neither greenish nor reddish
neither greenish nor reddish

chromatic colours, device colours
TV, print (PR), photo (PH)
six device (d) colours:
 C = C_d cyan blue (cyan)
 M = M_d magenta red (magenta)
 Y = Y_d yellow
 O = R_d orange red (red)
 L = G_d leaf green (green)
 V = B_d violet blue (blue)

NW-achromatic, and RG- and YB-chrom. thresholds as function of Y

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



Colour-difference formula LABJND 1985 (JND=just noticeable difference)

$$\Delta E_{JND}^* = \Delta E_{85}^* = A_0 [(\Delta Y)^2 + (A_3 \Delta a'' \cdot Y)^2 + (A_4 \Delta b'' \cdot Y)^2]^{1/2} / (A_1 + A_2 \cdot Y)$$

$$a = x/y \quad a_n = x_n/y_n \quad b = -0,4 z/Y \quad b_n = -0,4 z_n/y_n$$

$$a'' = a_n + (a - a_n) / (1 + 0,5 |a - a_n|) \quad n = D65 \text{ or } A \text{ (background)}$$

$$b'' = b_n + (b - b_n) / (1 + 0,5 |b - b_n|)$$

$$Y = (Y_1 + Y_2) / 2 \quad \Delta Y = Y_1 - Y_2 \quad \Delta a'' = a_1'' - a_2'' \quad \Delta b'' = b_1'' - b_2''$$

$$A_1 = 0,0170 \quad A_2 = 0,0058$$

$$A_3 = 1,0 \quad A_4 = 1,8 \quad A_0 = 1,5 \quad \text{background D65}$$

$$A_3 = 1,0 \quad A_4 = 1,7 \quad A_0 = 1,0 \quad \text{background A}$$

Just noticeable difference (JND) in four colour directions

$$\Delta Y = \text{const} (A_1 + A_2 \cdot Y) / A_0 \quad \text{in luminance direction } WN$$

$$\Delta a'' \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot A_3) \quad \text{in chromaticity direction } RG$$

$$\Delta b'' \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot A_4) \quad \text{in chromaticity direction } YB$$

$$\Delta c_{ab}'' \cdot Y = \text{const} (A_1 + A_2 \cdot Y) / (A_0 \cdot [A_3^2 + A_4^2]^{1/2}) \quad \text{in any chromaticity direction } c_{ab}$$

Colour-difference formula LABJND 1985 only for achromatic colours

$$\Delta E_{JND}^* = \Delta E_{85}^* = A_0 [(\Delta Y)^2 + (A_3 \Delta a \cdot Y)^2 + (A_4 \Delta b \cdot Y)^2]^{1/2} / (A_1 + A_2 \cdot Y)$$

$$a = x/y \quad b = -0,4 z/y$$

$$Y = (Y_1 + Y_2) / 2 \quad \Delta Y = Y_1 - Y_2 \quad \Delta a = a_1 - a_2 \quad \Delta b = b_1 - b_2$$

$$A_1 = 0,0170 \quad A_2 = 0,0058$$

$$A_3 = 1,0 \quad A_4 = 1,8 \quad A_0 = 1,5 \quad \text{background D65}$$

$$A_3 = 1,0 \quad A_4 = 1,7 \quad A_0 = 1,0 \quad \text{background A}$$

Just noticeable difference (JND) in three colour directions and line elements

$$A_0 \cdot \Delta Y = (A_1 + A_2 \cdot Y) \quad \text{in luminance direction } WN$$

$$A_0 \cdot \Delta a \cdot A_3 \cdot Y = (A_1 + A_2 \cdot Y) \quad \text{in chromaticity direction } RG$$

$$A_0 \cdot \Delta b \cdot A_4 \cdot Y = (A_1 + A_2 \cdot Y) \quad \text{in chromaticity direction } YB$$

$$dE_{85,L}^* = \frac{\delta}{\delta Y} L_{85}^* = \frac{\delta}{\delta Y} [(A_0 / A_2) \cdot \ln (A_1 + A_2 \cdot Y)] = A_0 \cdot dY / (A_1 + A_2 \cdot Y)$$

$$dE_{85,a}^* = \frac{\delta}{\delta a} a_{85}^* = \frac{\delta}{\delta a} [(A_0 \cdot A_3 \cdot Y \cdot a) / (A_1 + A_2 \cdot Y)] = A_0 \cdot da \cdot A_3 \cdot Y / (A_1 + A_2 \cdot Y)$$

$$dE_{85,b}^* = \frac{\delta}{\delta b} b_{85}^* = \frac{\delta}{\delta b} [(A_0 \cdot A_4 \cdot Y \cdot b) / (A_1 + A_2 \cdot Y)] = A_0 \cdot db \cdot A_4 \cdot Y / (A_1 + A_2 \cdot Y)$$

see similar files: <http://farbe.li.tu-berlin.de/BEA6/BEA6LONP.PDF> / .PS
 technical information: <http://farbe.li.tu-berlin.de> or <http://color.li.tu-berlin.de>

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 application for evaluation and measurement of display or print output
 TUB material: code=rh4ta

