

# color space CIELAB 1976, color values, -attributes, -chromaticities (a', b')

## tristimulus values X, Y, Z -> color attributes L\*, a\*, b\*

lightness  $L^* = 116 (Y/Y_n)^{1/3} - 16$   
RG chromaticness  $a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}] = 500 [a' - a'_n] Y^{1/3}$   
JB chromaticness  $b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}] = 500 [b' - b'_n] Y^{1/3}$

## color attributes L\*, a\*, b\* -> tristimulus values X, Y, Z

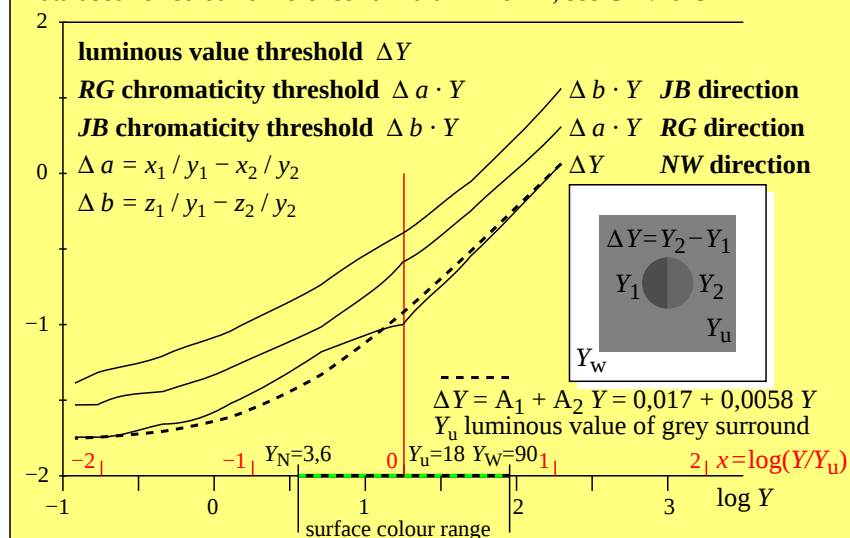
tristimulus values  $X = X_n [(L^* + 16) / 116 + a^*/500]^3$   
 $Y = Y_n [(L^* + 16) / 116]^3$   
 $Z = Z_n [(L^* + 16) / 116 - b^*/200]^3$

## chromaticity for CIELAB 1976, LABHNU 1977, LABHNUx 1979

CIELAB 1976, 2°  $a' = 0,2191 (x/y)^{1/3}$   $b' = -0,08376 (z/y)^{1/3}$   
LABHNU 1977  $a' = (x/y + 1/6)^{1/3} / 4$   $b' = -(z/y + 1/6)^{1/3} / 12$   
LABHNU1 1979  $a' = (x/y + 1) / 15$  linear!  $b' = -(z/y + 1/6)^{1/3} / 12$   
LABHNU2 1979  $a' = (x/y + 1/6)^{2/3} / 15$   $b' = -(z/y + 1/6)^{1/3} / 12$   
CIELAB 1976, 10°  $a' = 0,2193 (x_{10}/y_{10})^{1/3}$   $b' = -0,08417 (z_{10}/y_{10})^{1/3}$   
chromaticity constants  $a_2 = 500 (1/X_n)^{1/3} = 0,2191$   $b_2 = -200 (1/Z_n)^{1/3} = -0,08376$   
CIELAB, 2°, 10°  $a_{10} = 500 (1/X_{n,10})^{1/3} = 0,2193$   $b_{10} = -200 (1/Z_{n,10})^{1/3} = -0,08417$

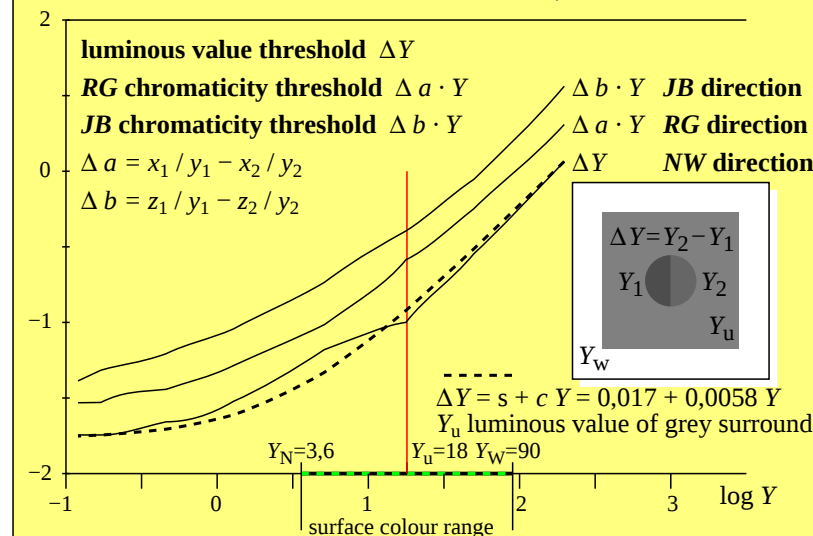
## Thresholds: NW achromatic and RG & JB chromatic as function of Y

Experiments and data: BAM-research report no. 115 (1985), page 72  
Data used for colour-difference formula LABJND, see CIE:2019



## Thresholds: NW achromatic and RG & JB chromatic as function of Y

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