

Color threshold formula LABJNDS 1996 for NW achromatic colours

$$\Delta E_{\text{JND,NW}}^* = Y_0 [(\Delta Y_W)^2 + (\Delta c_{\text{ab,W}} \cdot Y_W)^2]^{1/2} / (s + q \cdot Y_W)^g$$

$$= Y_0 [(\Delta Y_N)^2 + (\Delta c_{\text{ab,N}} \cdot Y_N)^2]^{1/2} / (s + q \cdot Y_N)^g$$

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

$$c_{\text{ab}} = [a_0^2 (a - a_n)^2 + b_0^2 (b - b_n)^2]^{1/2} \quad n = \text{D65 or A (surround)}$$

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

$$p_{\text{C,NW}} = c_{\text{ab,NW}} / c_{\text{ab,o}} = 0 \quad s = 0,0170 \quad q = 0,0058 \quad t = 1,0$$

$$a_0 = 1,0 \quad b_0 = 1,8 \quad Y_0 = 1,5 \quad \text{surround D65}$$

$$a_0 = 1,0 \quad b_0 = 1,7 \quad Y_0 = 1,0 \quad \text{surround A}$$

Just noticeable difference of complementary (c) NW colours with:

$$(a_W - a_n)Y_W = (a_N - a_n)Y_N; \quad (b_W - b_n)Y_W = (b_N - b_n)Y_N; \quad c_{\text{ab,W}}Y_W = c_{\text{ab,N}}Y_N$$

$$\Delta Y_W = \text{const} (s + q \cdot Y_W)^g / Y_0 \quad \text{in luminance direction WN}$$

$$\Delta c_{\text{ab,W}} \cdot Y_W = \text{const} (s + q \cdot Y_W)^g / Y_0 \quad \text{in any chromaticity direction } c_{\text{ab}}$$

$$\Delta c_{\text{ab,N}} \cdot Y_N = \text{const} (s + q \cdot Y_N)^g / Y_0 \quad \text{and for the NW purity } p_{\text{C,NW}}=0$$