

Line-element equations according to CIE 230:2019

Colour-discrimination function $f(x) = \Delta Y = \Delta x Y_u$ [0]

$$\Delta Y = (A_1 + A_2 Y) / A_0 \quad A_0 = 1,5, \quad A_1 = 0,0170, \quad A_2 = 0,0058$$

$$f_u(x) = \frac{\Delta Y}{\Delta Y_u} = \frac{1 + b x}{1 + b} \quad b = A_2 Y_u / A_1 \quad x = Y / Y_u \quad [1]$$

$$F_u(x) = \int \frac{f'_u(x)}{f_u(x)} dx = \int \frac{b}{1 + b x} dx \quad [2]$$

Example for $L^*(x)$ & ΔY with $x = Y / Y_u$, $x_u = 1$, $b = 6,141$:

$$L^*_u(x) = \frac{L^*(x)}{L^*(x_u)} = \frac{\ln(1 + b x)}{\ln(1 + b)} \quad [3]$$

$$f_u(x) = \frac{\Delta Y}{\Delta Y_u} = \frac{1 + b x}{1 + b} \quad [4]$$