

Achromatic colour vision with relative luminance

Mathematical equations with hyperbel functions

$$F_{cb}(x_r, c) = b \tanh(x_r/c) = b \frac{e^{x_r/c} - e^{-x_r/c}}{e^{x_r/c} + e^{-x_r/c}} \quad \begin{array}{l} x_r = \log(L_r) \\ L_r = L/L_u \\ x_r \geq 0 \end{array} \quad [1]$$

$$\frac{dF_{cb}(x_r, c)}{dx_r} = \frac{4b}{c[e^{x_r/c} + e^{-x_r/c}]^2} \quad \begin{array}{l} x_r = \ln L_r / \ln(10) \\ dx_r/dL_r = 1/(\ln(10)L_r) \\ n = 1/(\ln(10)c) \end{array} \quad [5]$$

$$\frac{dF_{cb}(x_r, c)}{dx_r} \frac{dx_r}{dL_r} = \frac{4bm}{[e^{x_r/c} + e^{-x_r/c}]^2 L_r} \quad \begin{array}{l} L_r/dL_r = L/dL \\ dF_{cb}(x_r, c) = 1 \end{array} \quad [6]$$

$$\frac{L}{dL} = \frac{4bm}{[e^{x_r/c} + e^{-x_r/c}]^2} \quad dL = \frac{[e^{x_r/c} + e^{-x_r/c}]^2 L}{4bm} \quad [7]$$