APCA Contrast prediction equation 0.0.98G-4g-base-W3

Clamp minimum contrast to 10% then offset & final scale:

$$\text{Lightness Contrast} \equiv L^c = \begin{cases} 0.0 & \text{if } |S_{apc}| < W_{\text{clamp}}, \\ (S_{apc} - W_{\text{offset}}) \times 100 & \text{if } S_{apc} > 0, \\ (S_{apc} + W_{\text{offset}}) \times 100 & \text{if } S_{apc} < 0. \end{cases}$$

Determine polarity, find lightness difference and scale:

$$S_{apc} = \begin{cases} \left(Y_{bg}^{Nbg} - Y_{txt}^{Ntx}\right) \times W_{scale} & \text{if } Y_{bg} > Y_{txt} \quad \text{(normal polarity: dark text/light bg)}, \\ \left(Y_{bg}^{Rbg} - Y_{txt}^{Rtx}\right) \times W_{scale} & \text{if } Y_{bg} < Y_{txt} \quad \text{(reverse polarity: light text/dark bg)}. \end{cases}$$

Soft clip and clamp black levels:

$Y_{txt} = f_{sc}(Y_s)$ where Y_s is derived from the color of the text, symbol or object;
$Y_{bg} = f_{sc}(Y_s)$ where Y_s is derived from the color used for the adjacent background;
Y_{fld} is unused in W3 version.

$$f_{sc}(Y_c) = \begin{cases} 0.0 & \text{if } Y_c < 0.0, \\ Y_c + (B_{\text{thrsh}} - Y_c)^{B_{\text{clip}}} & \text{if } Y_c < B_{\text{thrsh}}, \\ Y_c & \text{otherwise.} \end{cases}$$

Estimate screen luminance using sRGB coefficients:

$$Y_s = \sum \begin{cases} (R'/255.0)^{S_{trc}} \times 0.2126729 \\ (G'/255.0)^{S_{trc}} \times 0.7151522 \\ (B'/255.0)^{S_{trc}} \times 0.0721750 \end{cases}$$

Constants for 0.0.98G-4g-sRGB:

Powercurve exponents	Clamps and scalers
$S_{trc} = 2.4$	$B_{clip} = 1.414$
$Ntx = 0.57$	$B_{\text{thrsh}} = 0.022$
$Nbg = 0.56$	$W_{scale} = 1.14$
$Rtx = 0.62$	$W_{\text{offset}} = 0.027$
$Rbg = 0.65$	$W_{\text{clamp}} = 0.1$

Input: $R', G', B' \in$ sRGB, specified in the range $[0 - 255]$.

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