

line element of Stiles
(1946) with „color values” P, D, T
three separate color signal functions
 $F(P) = i \ln(1+9P)$
 $F(D) = j \ln(1+9D)$
 $F(T) = k \ln(1+9T)$
Taylor-derivations:
 $\Delta F(P, D, T) = \frac{dF}{dP} \Delta P + \frac{dF}{dD} \Delta D + \frac{dF}{dT} \Delta T$
 $= \frac{9i}{1+9P} \Delta P + \frac{9j}{1+9D} \Delta D + \frac{9k}{1+9T} \Delta T$

VE230-1, B4_47_1

line element of Vos&Walraven
(1972) with „color values” P, D, T
three separate color signal functions
 $F(P) = -2i\sqrt{P}$
 $F(D) = -2j\sqrt{D}$
 $F(T) = -2k\sqrt{T}$
Taylor-derivations:
 $\Delta F(P, D, T) = \frac{dF}{dP} \Delta P + \frac{dF}{dD} \Delta D + \frac{dF}{dT} \Delta T$
 $\Delta F(P, D, T) = \frac{i}{\sqrt{P}} \Delta P + \frac{j}{\sqrt{D}} \Delta D + \frac{k}{\sqrt{T}} \Delta T$

VE230-2, B4_47_2

functions $q[k(x-u)]$
„achromatic signal”-description
with $x = \log L$ (L = luminance)
 $u = \log L_u$ (L_u = surround luminan.)
 $q[k(x-u)] = 1 + 1/[1 + \sqrt{2}e^{k(x-u)}]$
function values:
 $q[k(x-u) \rightarrow +\infty] = 1$
 $q[k(x-u) = 0] = \sqrt{2}$
 $q[k(x-u) \rightarrow -\infty] = 2$

VE230-3, B4_48_1

„achromatic signal”-description
functions $Q_{lm}[k(x-u)]$
with $x = \log L$ (L = luminance)
 $u = \log L_u$ (L_u = surround luminan.)
 $Q_{lm}[k(x-u)] = -\frac{1}{\ln \sqrt{2}} \ln q[k(x-u)] - m$
function values with $l = m = 1$:
 $Q[k(x-u) \rightarrow +\infty] = 1$
 $Q[k(x-u) = 0] = 0$
 $Q[k(x-u) \rightarrow -\infty] = -1$

VE230-4, B4_48_2

„achromatic signal”discrimination
as function of relative light density
 $h = \ln H = k(x-u)$ $\ln$ = natural log.
 $Q' = \frac{d}{dh} [\ln \{1 + 1/(1 + \sqrt{2}H)\}] / \ln \sqrt{2}$
 $= -\sqrt{2} / [\ln \sqrt{2} (1 + \sqrt{2}H)(2 + \sqrt{2}H)]$
function values:
 $Q'[k(x-u) \rightarrow +\infty] = 0$
 $Q'[k(x-u) = 0] = -0,5$
 $Q'[k(x-u) \rightarrow -\infty] = 0$

VE230-5, B4_49_1

luminance discrimination
possibility $L/\Delta L$ as function of H
with: $L = 10^x$ $H = e^h = 10^{\log e k(x-u)}$
 $dL/dx = \ln 10 L$ $dH/dx = k H$
it follows: $L/\Delta L = [kH / (dH \ln 10)]$
 $\frac{L}{\Delta L} = \text{const } H / [(1 + \sqrt{2}H)(2 + \sqrt{2}H)]$
 $Q'[k(x-u) \rightarrow +\infty] = 0$
 $Q'[k(x-u) = 0] = \text{maximum}$
 $Q'[k(x-u) \rightarrow -\infty] = 0$

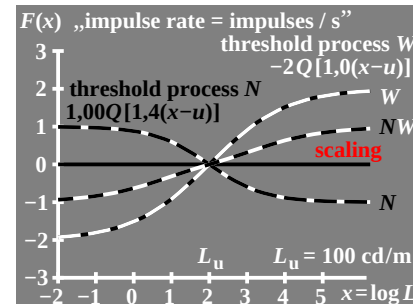
VE230-6, B4_49_2

double line element of Richter
(1987) for the lighting technic with
luminance $L = F(P, D, T)$
luminance signal function $F(L)$
 $F(L) = iQ(H) = \begin{cases} iQ(H) & (x < u) \\ \bar{i}Q(\bar{H}) & (x \geq u) \end{cases}$
with: $k=1,4$ $\bar{k}=1$ $i=1$ $\bar{i}=-2$
 $x = \log L$ $u = \log L_u$
 $H = e^{k(x-u)}$, $\bar{H} = e^{\bar{k}(x-u)}$, $\bar{H} = e^{\bar{k}(x-u)}$

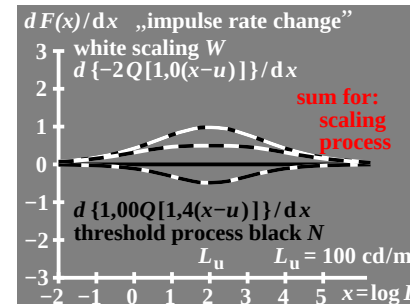
VE230-7, B4_50_1

double line element of Richter
(1987) for the lighting technic with
luminance $L = F(P, D, T)$
luminance signal function $F(L)$
 $F(L) = iQ(H)$ $H = e^{k(x-u)}$
 $Q[\ln \{1 + 1/(1 + \sqrt{2}H)\}] / \ln \sqrt{2} - 1$
Taylor-derivations:
 $\Delta F(L) = \frac{dF}{dL} \Delta L = i \frac{dQ}{dH} \Delta H$
 $= -i\sqrt{2} \Delta H / [\ln \sqrt{2} (1 + \sqrt{2}H)(2 + \sqrt{2}H)]$

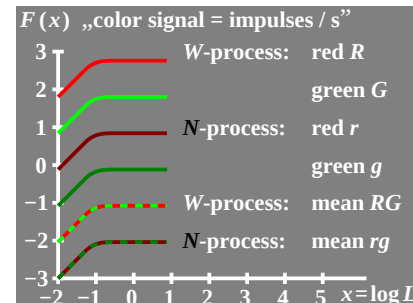
VE230-8, B4_50_2



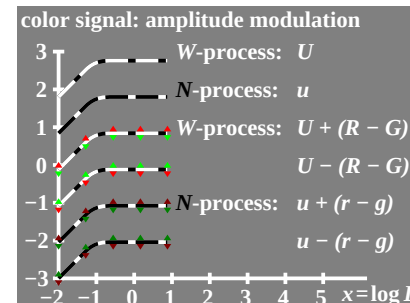
VE231-1, B4_52_1



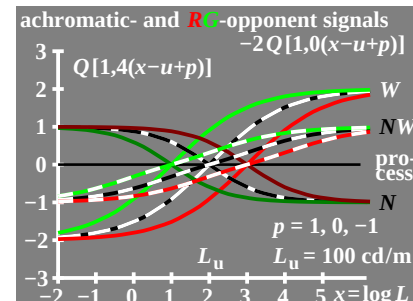
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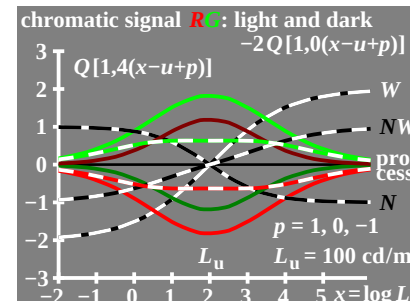
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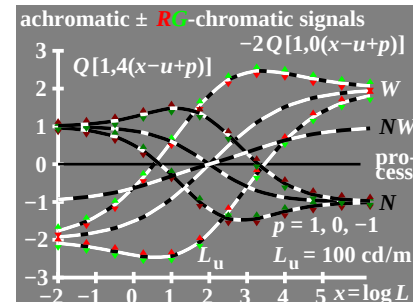
VE231-4, B4_53_2



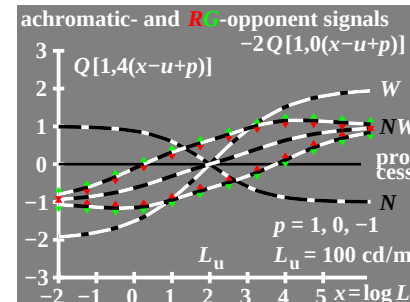
VE231-5, B4_54_1



VE231-6, B4_54_2



VE231-7, B4_55_1



VE231-8, B4_55_2