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:**
$\Delta F(P, D, T) = \frac{dF}{dP}\Delta P + \frac{dF}{dD}\Delta D + \frac{dF}{dT}\Delta T$
$= \frac{9i}{1+9P}\Delta P + \frac{9j}{1+9D}\Delta D + \frac{9k}{1+9T}\Delta T$
Ae120−1

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:**
$\Delta F(P, D, T) = \frac{dF}{dP}\Delta P + \frac{dF}{dD}\Delta D + \frac{dF}{dT}\Delta T$
$\Delta F(P, D, T) = \frac{i}{\sqrt{P}}\Delta P + \frac{j}{\sqrt{D}}\Delta D + \frac{k}{\sqrt{T}}\Delta T$
Ae120−2

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:
$q[k(x-u) \to +\infty] = 1$
$q[k(x-u) = 0] = \sqrt{2}$
$q[k(x-u) \to -\infty] = 2$
Ae120−3

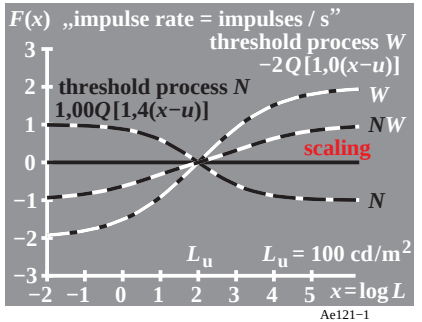
„achromatic signal"-description functions $Q_{lm}[k(x-u)]$
with $x = \log L$ (L = luminance)
$u = \log L_u$ (L_u = surround luminan.)
$Q_{lm}[k(x-u)] = \frac{l}{\ln\sqrt{2}}\ln q[k(x-u)] - m$
function values with $l = m = 1$:
$Q[k(x-u) \to +\infty] = 1$
$Q[k(x-u) = 0] = 0$
$Q[k(x-u) \to -\infty] = -1$
Ae120−4

„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:
$Q'[k(x-u) \to +\infty] = 0$
$Q'[k(x-u) = 0] = -0{,}5$
$Q'[k(x-u) \to -\infty] = 0$
Ae120−5

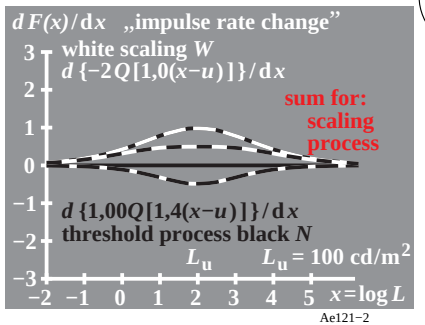
luminance discrimination possibility $L/\Delta L$ as function of H
with: $L = 10^x$ $H = e^h = 10^{\log e\, k(x-u)}$
$dL/dx = \ln 10\, L$ $dH/dx = k\, H$
it follows: $L/\Delta L = [k\, H/(dH \ln 10)]$
$\frac{L}{dL} = \text{const}\ H/[(1+\sqrt{2}H)(2+\sqrt{2}H)]$
$Q'[k(x-u) \to +\infty] = 0$
$Q'[k(x-u) = 0] =$ maximum
$Q'[k(x-u) \to -\infty] = 0$
Ae120−6

double line element of *Richter* (1987) for the lighting technic with luminance $L = F(P, D, T)$
luminance signal function $F(L)$
$F(L) = iQ(H) = \begin{cases} \underline{i}\, Q(\underline{H}) & (x < u) \\ \bar{i}\, Q(\bar{H}) & (x \geq u) \end{cases}$
with: $k=1,4$ $\bar{k}=1$ $i=1$ $\bar{i}=-2$
$x = \log L$ $u = \log L_u$
$H = e^{k(x-u)}$, $\underline{H} = e^{\underline{k}(x-u)}$, $\bar{H} = e^{\bar{k}(x-u)}$
Ae120−7

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:**
$\Delta F(L) = \frac{dF}{dL}\Delta L = i\frac{dQ}{dH}\Delta H$
$= -i\sqrt{2}\Delta H/[\ln\sqrt{2}(1+\sqrt{2}H)(2+\sqrt{2}H)]$
Ae120−8



Ae121−1



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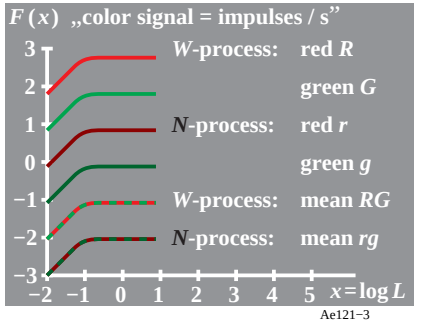

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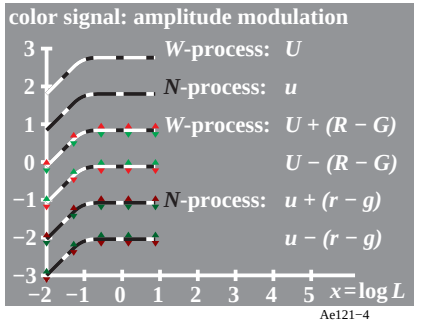

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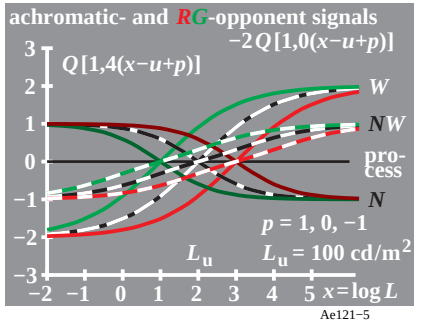

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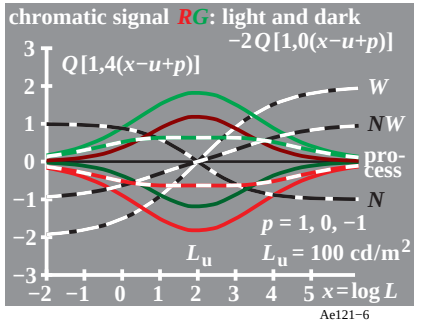

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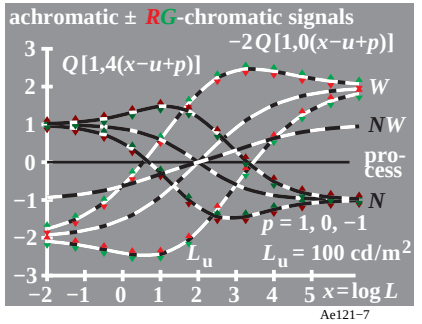

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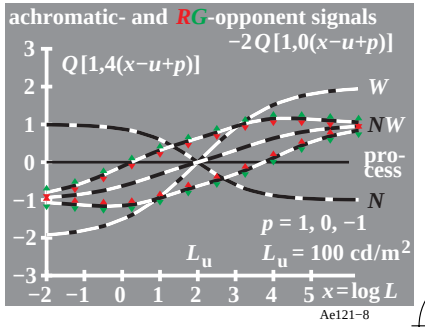

Ae121−8

See for similar files: http://www.ps.bam.de/Ae12/; www.ps.bam.de/Ae.HTM
Technical information: http://www.ps.bam.de Version 2.1, io=1,1

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BAM material: code=rha4ta