http://farbe.li.tu-berlin.de/hex4/hex4l0n1.txt /.ps; only vector graphic VG; start output
see similar files: http://farbe.li.tu-berlin.de/hex4/hex4.htm

see similar files of the whole serie: http://farbe.li.tu-berlin.de/hexs.htm
technical information: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

$F(x) = \tanh(x) = \frac{e^{x}-e^{-x}}{e^{x}+e^{-x}} = \frac{u(x)}{v(x)} \quad u'(x)=v(x) \quad v'(x)=u(x)$ [1]

$F'(x) = \frac{u'(x)\,v(x) - u(x)\,v'(x)}{v^2(x)} = \frac{v^2(x) - u^2(x)}{v^2(x)}$ [2]

$F'(x) = \frac{[e^{x}+e^{-x}][e^{x}+e^{-x}] - [e^{x}-e^{-x}][e^{x}-e^{-x}]}{[e^{x}+e^{-x}]^2}$ [3]

$F'(x) = \frac{4}{[e^{x}+e^{-x}]^2} = \frac{1}{\cosh^2(x)}$ [4]

hex41−2n, eeo31−2n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

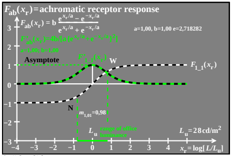
$F(x/a) = \tanh(x/a) = \frac{e^{x/a}-e^{-x/a}}{e^{x/a}+e^{-x/a}} = \frac{u(x/a)}{v(x/a)}$ [1]

$F'(x/a) = \frac{u'(x/a)v(x/a) - u(x/a)v'(x/a)}{v^2(x/a)}$ [2]

$F'(x/a) = \frac{v^2(x/a) - u^2(x/a)}{a\,v^2(x/a)}$ [3]

$F'(x/a) = \frac{4}{a\,[e^{x/a}+e^{-x/a}]^2} = \frac{1}{a\cosh^2(x/a)}$ [4]

hex41−4n, eeo31−4n



hex41−5n, eeo31−5n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

$F_{ab}(x/a) = b\tanh(x/a) = b\frac{e^{x/a}-e^{-x/a}}{e^{x/a}+e^{-x/a}} = b\frac{u(x/a)}{v(x/a)}$ [1]

$F'_{ab}(x/a) = b\frac{u'(x/a)\,v(x/a) - u(x/a)\,v'(x/a)}{v^2(x/a)}$ [2]

$F'_{ab}(x/a) = b\frac{v^2(x/a) - u^2(x/a)}{a\,v^2(x/a)}$ [3]

$F'_{ab}(x/a) = \frac{4b}{a\,[e^{x/a}+e^{-x/a}]^2} = \frac{b}{a\cosh^2(x/a)}$ [4]

hex41−2n eeo41−2n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

$F_{1b}(x) = b\tanh(x) = b\frac{e^{x}-e^{-x}}{e^{x}+e^{-x}} = b\frac{u(x)}{v(x)}$ [1]

$F'_{1b}(x) = b\frac{u'(x)\,v(x) - u(x)\,v'(x)}{v^2(x)}$ [2]

$F'_{1b}(x) = b\frac{v^2(x) - u^2(x)}{a\,v^2(x)}$ [3]

$F'_{1b}(x) = \frac{4b}{[e^{x}+e^{-x}]^2} = \frac{b}{\cosh^2(x)}$ [4]

hex41−6n, eeo31−6n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

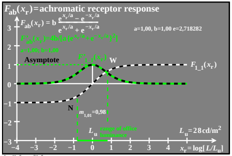
$F_{ab}(x/a) = b\tanh(x/a) = b\frac{e^{x/a}-e^{-x/a}}{e^{x/a}+e^{-x/a}} = b\frac{u(x/a)}{v(x/a)}$ [1]

$F'_{ab}(x/a) = b\frac{u'(x/a)\,v(x/a) - u(x/a)\,v'(x/a)}{v^2(x/a)}$ [2]

$F'_{ab}(x/a) = b\frac{v^2(x/a) - u^2(x/a)}{a\,v^2(x/a)}$ [3]

$F'_{ab}(x/a) = \frac{4b}{a\,[e^{x/a})+e^{-x/a}]^2} = \frac{b}{a\cosh^2(x/a)}$ [4]

hex41−8n, eeo31−8n



hex41−5n, eeo31−5n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

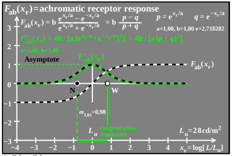
$F_{ab}(x/a) = b\tanh(x/a) = b\frac{e^{x/a}-e^{-x/a}}{e^{x/a}+e^{-x/a}} = b\frac{u(x/a)}{v(x/a)}$ [1]

$F'_{ab}(x/a) = b\frac{u'(x/a)\,v(x/a) - u(x/a)\,v'(x/a)}{v^2(x/a)}$ [2]

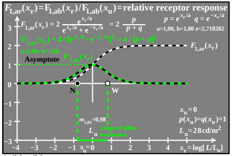
$F'_{ab}(x/a) = b\frac{v^2(x/a) - u^2(x/a)}{a\,v^2(x/a)}$ [3]

$F'_{ab}(x/a) = \frac{4b}{a\,[e^{x/a}+e^{-x/a}]^2} = \frac{b}{a\cosh^2(x/a)}$ [4]

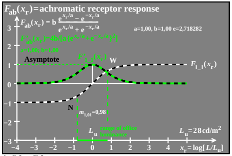
hex41−4n eeo41−4n



hex40−5n eeo40−5n



hex40−6n eeo40−6n



hex41−5n, eeo31−5n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

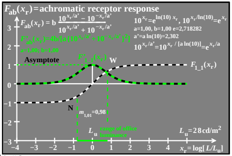
$F_{ab}(x/a) = b\tanh(x/a) = b\frac{e^{x/a}-e^{-x/a}}{e^{x/a}+e^{-x/a}}$ [1]

$\frac{dF_{ab}(x/a)}{dx} = \frac{4b}{a[e^{x/a}+e^{-x/a}]^2} = \frac{b}{a\cosh^2(x/a)}$ [4]

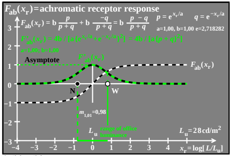
$\frac{dF_{ab}(x_r/a)}{dx_r} = \frac{4b}{a[e^{x_r/a}+e^{-x_r/a}]^2} \quad x_r=\log(L/L_u)$ [5] $\quad dx_r/dL=\ln(10)/L$

$\frac{dF_{ab}(x_r/a)}{dx_r}\,\frac{dx_r}{dL} = \frac{4b}{a[e^{x_r/a}+e^{-x_r/a}]^2}\,\frac{\ln(10)}{L}$ [6]

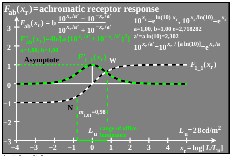
hex41−6n eeo41−6n



hex41−7n



hex40−8n eeo40−8n



hex41−7n, eeo31−7n

Mathematical equations of hyperbel functions

See: *Papula, L., (2003), Mathematische Formelsammlung, Vieweg*

$F_{ab}(x_r/a) = b\tanh(x_r/a) = b\frac{e^{x_r/a}-e^{-x_r/a}}{e^{x_r/a}+e^{-x_r/a}}$ [1]

$\frac{dF_{ab}(x_r/a)}{dx_r} = \frac{4b}{a[e^{x_r/a}+e^{-x_r/a}]^2} \quad x_r=\log(L/L_u)$ [5] $\quad dx_r/dL=\ln(10)/L$

$\frac{dF_{ab}(x_r/a)}{dx_r}\,\frac{dx_r}{dL} = \frac{4b}{a[e^{x_r/a}+e^{-x_r/a}]^2}\,\frac{\ln(10)}{L}$ [6]

$\frac{L}{dL} = \frac{4b\ln(10)}{a[e^{x_r/a}+e^{-x_r/a}]^2} \quad dL = \frac{a[e^{x_r/a}+e^{-x_r/a}]^2 L}{4b\ln(10)}$ [7]

hex41−8n eeo41−8n

TUB-test chart hex4; Model of normalized response function $F_{ab}(x_r)$ and derivation $F'_{ab}(x_r)$
Mathematical calculation of the derivation $F'_{ab}(x_r)$, of the contrast $L/\Delta L$, and the discrimination ΔL

TUB registration: 20241201-hex4/hex4l0n1.txt /.ps
application for evaluation and measurement of display or print output

TUB material: code=rha4ta