See original or copy: http://web.me.com/klaus.richter/ME35/ME35L0N1.TXT /.PS
Technical information: http://www.ps.bam.de or http://130.149.60.45/~farbmetrik

TUB registration: 20101101-ME35/ME35L0N1.TXT /.PS
application for measurement of printer or monitor systems

TUB material: code=tha4a

PSL2-program code: raster cell threshold data (24 × 24, 8 bit, horizontal)

```
%!PS-Adobe-3.0 B7211-7n.eps mit h24n721.for, 20.10.94
%%BoundingBox: 72 90 226 204
/FS {findfont exch scalefont setfont} bind def
/MM {72 25.4 div mul /str {8 string } bind def
/languagelevel where {pop languagelevel} {1} ifelse
2 ge {//HalftoneType 3 /Width 24 /Height 24 /Thresholds
<F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0
  E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0
  D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0
  C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0
  B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0
  A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0
  9090909090909090909090909090909090909090909090
  8080808080808080808080808080808080808080808080
  6060606060606060606060606060606060606060606060
  4040404040404040404040404040404040404040404040
  3030303030302020201010101010101020202030303030303030
  3030303030202020101010101010101020202030303030303030
  3030303030202020101010101010101020202030303030303030
  3030303030202020101010101010101020202030303030303030
  3030303030202020101010101010101020202030303030303030
  5050505050505050505050505050505050505050505050505050
  7070707070707070707070707070707070707070707070707070
  9090909090909090909090909090909090909090909090909090
  A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0
  B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0
  C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0
  D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0
  E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0
  F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0F0>
  counttomark 2 idiv dup dict begin {def} repeat
  pop currentdict end sethalftone} if %def.Dictionary
%%EndProlog

72 90 translate 0.01  MM dup scale 15 setlinewidth
0 0  moveto 5400 0 rlineto 0 4000 rlineto
          -5400 0 rlineto closepath stroke
/xyw {4000 24 div} bind def /xw {16 xyw mul} bind def
/x0 {8 xyw mul} bind def /y0 {5 xyw mul} bind def
0 1 15 {dup 0.0666 mul 1 exch sub setgray
          xyw mul y0 add x0 exch moveto
          xw 0 rlineto 0 xyw rlineto
          xw neg 0 rlineto closepath fill} for
200 /Times-ISOL1 FS 0 setgray /D16str {0123456789ABCDEF} def
0 1 15 {/nr exch def nr xyw mul y0 add x0 250 sub exch
          moveto D16str nr 1 getinterval show} for

 xyw 3.5 xyw mul moveto
(<</HalftoneType 3 /Width 24 /Height 24 /Thresholds) show
 xyw 2.0 xyw mul moveto
(%in middle 7 × 5 "10", 13 × 5 "20", 24 × 5 "30", etc.) show
 xyw 0.5 xyw mul moveto
(>> sethalftone %<<, >> see PSL2 hand book, page 361) show
showpage
```

ME350–7, B8_29

digital image processing with *Adobe PostScript Level 2* CIEBased*ABC*−color space

The *ABC*−color data represent zone theory of colorvision in two non linear steps:

1. non linear trichromatic step
2. non linear opponent color step

ME351–1, B8_33_1

CIE 1931 *XYZ*−color space in PSL2

```
[/CIEBasedABC<<   %Dict PostScript Level 2
 /MatrixABC [1 0 0 0 1 0 0 0 1] %default
 /DecodeABC [{} {} {}] %default, empty function
 /RangeABC [ 0 0.9505 0 1 0 1.0890] %D65
 /MatrixLMN [1 0 0 0 1 0 0 0 1] %default
 /DecodeLMN [{} {} {}] %default, empty function
 /RangeLMN [ 0 0.9505 0 1 0 1.0890] %D65
 /WhitePoint [0.9505 1 1.0890] %D65
 /BlackPoint [0 0 0] % default
>>]setcolorspace
```

ME351–3, B8_33_3

EBU−*RGB**−color space in PSL2

```
[/CIEBasedABC<<   %Dict PostScript Level 2
 /MatrixABC [1 0 0 0 1 0 0 0 1] %default
 /DecodeABC [{} {} {}] %default, empty function
 /RangeABC [ 0 0.9505 0 1 0 1.0890] %D65
 /MatrixLMN [0.4303 0.2219 0.0202 0.3416
             0.6720 0.1412 0.1845 0.0833 0.9227]
 /DecodeLMN [{2.2 exp} {2.2 exp} {2.2 exp}]
 /RangeLMN [ 0 0.9505 0 1 0 1.0890] %D65
 /WhitePoint [0.9505 1 1.0890] %D65
 /BlackPoint [0 0 0] % default
>>]setcolorspace
```

ME351–5, B8_34_2

CIELAB 1976 *L*a*b**−color space definition and reversal

$$L^* = 116\,(Y/Y_n)^{1/3} - 16$$
$$a^* = 500\,[\,(X/X_n)^{1/3} - (Y/Y_n)^{1/3}\,]$$
$$b^* = 200\,[\,(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}\,]$$

$$X = X_n\,[\,(L^*+16)/116 + a^*/500\,]^3$$
$$Y = Y_n\,[\,(L^*+16)/116\,]^3$$
$$Z = Z_n\,[\,(L^*+16)/116 - b^*/200\,]^3$$

ME350–7, B8_35_1

CIEBased*ABC*−color space in PSL2 transformation *ABC* −> XYZ* three colorness −> tristimulus values

$$\begin{pmatrix} L^* \\ M^* \\ N^* \end{pmatrix} = \begin{matrix} 3\times 3 \\ \text{Matrix}ABC \end{matrix} \times \begin{pmatrix} D(A^*) \\ D(B^*) \\ D(C^*) \end{pmatrix}$$

$$\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = \begin{matrix} 3\times 3 \\ \text{Matrix}LMN \end{matrix} \times \begin{pmatrix} D(L^*) \\ D(M^*) \\ D(N^*) \end{pmatrix}$$

ME351–2, B8_33_2

CIEBased*ABC*−color space in PSL2 *LMN* / OLV* / RGB* −> XYZ* EBU-screen phosphors, D65

$$L = \text{Decode}L^* = \{2.2\ \text{exp}\}$$
$$M = \text{Decode}M^* = \{2.2\ \text{exp}\}$$
$$N = \text{Decode}N^* = \{2.2\ \text{exp}\}$$

$$\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = \begin{pmatrix} 0{,}4303 & 0{,}3416 & 0{,}1782 \\ 0{,}2219 & 0{,}7068 & 0{,}0713 \\ 0{,}0202 & 0{,}1296 & 0{,}9387 \end{pmatrix} \times \begin{pmatrix} L \\ M \\ N \end{pmatrix}$$

ME351–4, B8_34_1

CIEBased*ABC*−color space in PSL2 *LMN* / OLV* / RGB* −> XYZ* NTSC-screen phosphors, D65

$$L = \text{Decode}L^* = \{1.8\ \text{exp}\}$$
$$M = \text{Decode}M^* = \{1.8\ \text{exp}\}$$
$$N = \text{Decode}N^* = \{1.8\ \text{exp}\}$$

$$\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = \begin{pmatrix} 0{,}4497 & 0{,}3163 & 0{,}1845 \\ 0{,}2446 & 0{,}6720 & 0{,}0833 \\ 0{,}0252 & 0{,}1412 & 0{,}9227 \end{pmatrix} \times \begin{pmatrix} L \\ M \\ N \end{pmatrix}$$

ME351–6, B8_34_3

CIELAB 1976 *L*a*b**−color space and CIEBased*ABC*−transformation

$$X = X_n\,[\,(L^*+16)/116 + a^*/500\,]^3$$
$$Y = Y_n\,[\,(L^*+16)/116\,]^3$$
$$Z = Z_n\,[\,(L^*+16)/116 - b^*/200\,]^3$$

$$A = \text{Decode}L^* = \{16\ \text{add}\ 116\ \text{div}\}$$
$$B = \text{Decode}a^* = \{500\ \text{div}\}$$
$$C = \text{Decode}b^* = \{200\ \text{div}\}$$

ME351–8, B8_35_2