Input	Output	Input and output media and applications Input media	Output media	Application	Standard
–	–	–	–	**Basis**	**DIN 33866−1**
analog	**analog**	DIN-test chart (hardcopy)	Hardcopy	**Copier**	**DIN 33866−2**
analog	**digital**	DIN-test chart (hardcopy)	File	**Scanner**	**DIN 33866−4**
digital	**analog**	DIN-test chart (File)	Hardcopy Softcopy	**Printer** **Display**	**DIN 33866−3** **DIN 33866−5**

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Input	Output	Input and output media and applications Input media	Output media	Application	Standard or TR Technical Report
–	–	–	–	**Basis**	**ISO/IEC TR 24705**
analog	**analog**	ISO/IEC-test chart (hardcopy)	Hardcopy	**Copier**	**ISO/IEC 15775**
analog	**digital**	ISO/IEC-test chart (hardcopy)	File	**Scanner**	**ISO/IEC TR 24705**
digital	**analog**	ISO/IEC-test chart (File)	Hardcopy Softcopy	**Printer** **Display**	**ISO/IEC TR 24705** **ISO/IEC TR 24705**

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Input	Output	Input and output media and applications Input media	Output media	Application	Technical Report (TR) or Standard	Method & Test: Linearization
–	–	–	–	**Basis**	**ISO/IEC TR 24705**	**DIN 33866−1** **DIN 33872−1**
analog	**analog**	ISO/IEC-file series equally spaced in *rgb* + ISO/IEC-test chart (hardcopy) series equally spaced in *LCh**	Hardcopy	**Copier**	**ISO/IEC 15775**	**DIN 33866−2** **JIS X 6933**
analog	**digital**	ISO/IEC-test chart (hardcopy) series equally spaced in *Lch**	File	**Scanner**	**ISO/IEC TR 24705**	**DIN 33866−4**
digital	**analog**	ISO/IEC-test chart (File) series equally spaced in *rgb*	Hardcopy Softcopy	**Printer** **Display**	**ISO/IEC TR 24705** **ISO 9241−306:2008**	**DIN 33866−3** **DIN 33872−2,4** **DIN 33866−5** **DIN 33872−2,4**

The ISO/IEC-input linearisation method produces an ISO/IEC-file from an ISO/IEC-original scene:
Flower motiv with 16 equidistant grey steps, and 14 CIE-test colours according to CIE 13.3
The ISO/IEC-output linearisation method produces from an ISO/IEC-file a linearized display, offset or printer output:

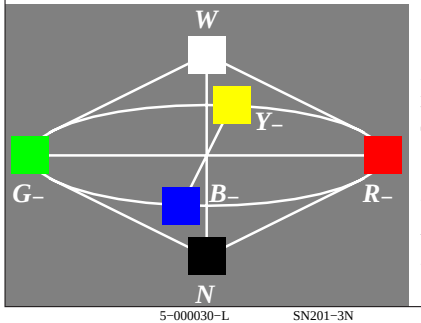
ISO/IEC-input linearisation method				**ISO/IEC-output linearisation method**			
Input	**Output**	**Application**	**Technical Report (TR) or Standard**	**Input**	**Output media**	**Application**	**Technical Report (TR) or Standard**
Original scene + CIE colours	ISO/IEC Image File	Reference Image File	**ISO/IEC 15775** **ISO/IEC TR 24705**	ISO/IEC File	Hardcopy	Printer	**ISO/IEC TR 19797**
				ISO/IEC File	Softcopy	Display	**ISO 9241−306:2008** 8 viewing conditions
				ISO/IEC File	Softcopy Hardcopy Hardcopy	Display Offset Printer	**CIE R8−09:2015** device space + device-independent visual RGB* space

SN200−7N

What is Output Linearization? (For the elemetary hues, see CIE R1−47:2009.)
The colour space of a double cone includes 6 colours. The six colours can be the device-dependent device colours (index d): ***(R, Y, G, B, N, W)*$_{\mathbf{d}}$**
or the device-independent elementary colours (index e): ***(R, Y, G, B, N, W)*$_{\mathbf{e}}$**.
Elementary red appears neither yellowish nor bluish. The hue angle is $h_{ab,e} = 26$.

For example for the ***sRGB*** colours according to IEC 61966−2−1 it is valid:
Device red R_d has the coordinates rgb^*_{Rd} and $LCh^*_{Rd}=(L^*, C^*_{ab}, h_{ab})_{Rd}$
Elementary red R_e has the coordinates rgb^*_{Re} and $LCh^*_{Re}=(L^*, C^*_{ab}, h_{ab})_{Re}$
Corresponding data are given in the following for R_d, R_e, and $W=W_d=W_e$

$rgb_W = (1\ 1\ 1)_W$
$LCh^*W=(L^*, C^*_{ab}, h_{ab})_W = (95, 0, -)_W$



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$rgb^*_{Rd} = (1\ 0\ 0)_{Rd}$
$LCh^*_{Rd} = (50, 100, 40)_{Rd}$
$rgb_{Re} = (1\ 0\ 0)_{Re}$
$LCh^*_{Re} = (50, 87, 26)_{Re}$

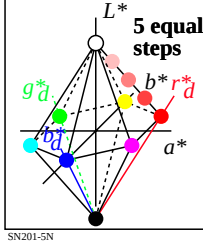
Output Linearization of CIE R1−09:2015 produces for the hue angle $h_{ab,Re} = 26$ the CIELAB data $L^*_{Re} = 50$ and $C^*_{ab,Re} = 87$. These CIELAB data are produced with the device to elementary input data (de)

$rgb_{de,Re} = (1\ 0\ 0{,}26)_{de,Re}$

A calculated table for 360 hue angles includes:

h_{ab}	LCh^*_{de}	rgb_{de}
26	50 87 26	1 0 0,26

Three device (d) coordinates rgb^*_d describe 8 device colours RGB_d, CMY_d, and *NW*.



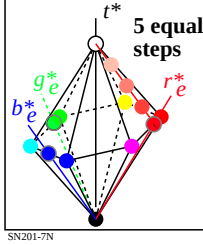
SN201-5N

Hexagon-triangle system based on device (d) colours: rgb^*_d
with **linear relations** between rgb^*_d − LCH^*_d
(compare approximately linear relations between rgb_{sRGB} and L)*

Equations rgb^*_d − LCH^*_d in both directions have been published, see:
Richter, CIE-Proceedings, Beijing, 2008, Volume 3 und DIN 33872-1

Three equations (tables) are needed for office applications:
$rgb_d - LCH^*{}'_d$ for a 9x9x9 grid of equally spaced rgb_d input data
$rgb^*_d - LCH^*_d$ a 9x9x9 grid of equally spaced data rgb^*_d and LCH^*_d
$rgb'^*_d - LCH'^*_d \sim LCH^*_d$ device linearization: $rgb_d -> rgb'^*_d = rgb_{dd}$

Three elementary (e) coordinates rgb^*_e describe 8 colours RGB_e, CMY_e, and *NW*.



SN201-7N

Hexagon-triangle system based on elementary (e) colours: rgb^*_e
with **linear relations** between rgb^*_e − LCH^*_e
(compare approximately linear relations between rgb_{sRGB} and L)*

Equations rgb^*_e − LCH^*_e in both directions have been published, see:
Richter, CIE-Proceedings, Beijing, 2008, Volume 3 und DIN 33872-1

Three equations (tables) are needed for office applications:
$rgb_d - LCH^*{}'_d$ for a 9x9x9 grid of equally spaced rgb_d-input data
$rgb^*_e - LCH^*_e$ a 9x9x9 grid of equally spaced data rgb^*_e and LCH^*_e
$rgb'^*_e - LCH'^*_e \sim LCH^*_e$ elementary linearization: $rgb_d -> rgb'^*_e = rgb_{de}$

input: *w/rgb/cmyk −> w/rgb/cmyk*$_d$
output: no change compared