Colorimetric data for system lines TLS70 −> ORS18, TLS00, NRS18, SRS18

For input ***LCH*a0*** (TLS70) and output ***LCH*am*** for 4 systems (***m*** = 0 to 4)
Six CIELAB hue angles of device ORS18: (37.7 96.4 150.9 236.0 305.0 353.7);
Six CIELAB hue angles of device TLS00: (40.0 102.8 136.0 196.4 306.3 328.2);
Six CIELAB hue angles of device NRS18: (25.5 92.3 162.2 217.0 271.7 328.6);
Six CIELAB hue angles of device SRS18: (30.0 90.0 150.0 210.0 270.0 330.0);

no.	Colour	->TLS70 LCH*a0			->TLS70 n*, c*, H*ai0			ORS18 LCH*a1			TLS00 LCH*a2			NRS18 LCH*a3			SRS18 LCH*a4		
01	O=o00y	78.2	14.1	22	0.3	0.5	22	48.5	35.3	22	45.2	47.2	22	52.8	37.5	22	52.8	36.1	22
02	o10y	79.0	12.6	30	0.3	0.5	30	48.5	36.2	30	44.8	50.0	30	52.8	36.9	30	52.8	38.7	30
03	o20y	80.0	11.5	39	0.3	0.5	39	48.9	40.8	39	44.4	54.8	39	52.8	34.4	39	52.8	35.9	39
04	o30y	80.9	10.9	48	0.3	0.5	48	52.2	38.1	48	47.0	46.7	48	52.8	32.9	48	52.8	34.3	48
05	o40y	81.7	10.5	56	0.3	0.5	56	55.1	36.7	56	49.7	44.4	56	52.8	32.3	56	52.8	33.6	56
06	o50y	82.6	10.4	65	0.3	0.5	65	58.3	36.0	65	52.7	43.1	65	52.8	32.5	65	52.8	33.6	65
07	o60y	83.4	10.5	73	0.3	0.5	73	61.2	36.2	73	55.4	42.9	73	52.8	33.3	73	52.8	34.4	73
08	o070y	84.4	10.9	82	0.3	0.5	82	64.5	37.3	82	58.4	43.6	82	52.8	35.1	82	52.8	36.1	82
09	o80y	85.2	11.5	90	0.3	0.5	90	67.4	39.1	90	61.1	45.2	90	52.8	37.7	90	52.8	38.7	90
10	o90y	86.1	12.6	99	0.3	0.5	99	68.7	45.1	99	64.1	48.3	99	52.8	36.0	99	52.8	35.9	99
11	Y=y00l	86.9	14.1	107	0.3	0.5	107	65.8	42.8	107	64.8	45.7	107	52.8	33.8	107	52.8	34.4	107

Goal: Transfer coordinates ***LCH*a0*** (system m=0) to ***LCH*am*** (system m=1 to 4)

The given data ***LCH*a0*** include the device hue ***H*a0***
Integer (i) device hue: $H^*_{ai0} = round\ (H^*_{a0})$ (1)

Fetch device data $LCH^*_{a,M0}$ from table with 361 entries for H^*_{ai0} from 0 to 360 degrees
Lightness, chroma, hue: $LCH^*_{a,M0} = LCH^*_{a,M0}\ [\ H^*_{ai0}\ ]$ (2)

Calculate ***lcnw**** data from ***LC*a0*** and $LC^*_{a,M0}$:
Relative lightness: $l^* = [\ L^*_0 - L^*_{N0}\ ] / [\ L^*_{W0} - L^*_{N0}\ ]$ (3)
Relative chroma: $c^* = C^*_{a0} / C^*_{a,M0}$ (4)
Relative Blackness: $n^* = 1 - l^* + c^*\ [\ L^*_{M0} - L^*_{N0}\ ] / [\ L^*_{W0} - L^*_{N0}\ ]$ (5)

Fetch device data $LCH^*_{a,Mm}$ from table with 361 entries for H^*_{ai0} from 0 to 360 degrees
lightness, chroma, hue: $LCH^*_{a,Mm} = LCH^*_{a,Mm}\ [\ H^*_{ai0}\ ]$ (6)

For any input or output device (m=0 to 4) it is valid for constant ***n*, c*, l*, H*a***:
CIELAB lightness: $L^*_m = L^*_{am} = L^*_{Nm} + l^*\ [\ L^*_{Wm} - L^*_{Nm}\ ]$ (7)
Adated CIELAB chroma: $C^*_{am} = c^*\ C^*_{a,Mm}$ (8)
Adated CIELAB hue: $H^*_{am} = H^*_{a0}$ (9)

Result: device dependent adapted CIELAB data of 4 systems m=1 to 4:
lightness, chroma, hue: ***LCH*am*** (10)

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Colorimetric data for system lines TLS70 −> ORS18, TLS00, NRS18, SRS18

For input ***olv*30*** (TLS70) and output ***LCH*am*** for 4 systems (***m*** = 0 to 4)
Six CIELAB hue angles of device ORS18: (37.7 96.4 150.9 236.0 305.0 353.7);
Six CIELAB hue angles of device TLS00: (40.0 102.8 136.0 196.4 306.3 328.2);
Six CIELAB hue angles of device NRS18: (25.5 92.3 162.2 217.0 271.7 328.6);
Six CIELAB hue angles of device SRS18: (30.0 90.0 150.0 210.0 270.0 330.0);

no.	Colour	->TLS70 olv*30			->TLS70 n*, c*, H*si0			ORS18 LCH*a1			TLS00 LCH*a2			NRS18 LCH*a3			SRS18 LCH*a4		
01	O=o00y	0.7	0.2	0.2	0.3	0.5	30	48.5	35.3	22	45.2	47.2	22	52.8	37.5	22	52.8	36.1	22
02	o10y	0.7	0.25	0.2	0.3	0.5	35	48.5	36.2	30	44.8	50.0	30	52.8	36.9	30	52.8	38.7	30
03	o20y	0.7	0.3	0.2	0.3	0.5	41	48.9	40.8	39	44.4	54.8	39	52.8	34.4	39	52.8	35.9	39
04	o30y	0.7	0.35	0.2	0.3	0.5	47	52.2	38.1	48	47.0	46.7	48	52.8	32.9	48	52.8	34.3	48
05	o40y	0.7	0.4	0.2	0.3	0.5	53	55.1	36.7	56	49.7	44.4	56	52.8	32.3	56	52.8	33.6	56
06	o50y	0.7	0.45	0.2	0.3	0.5	60	58.3	36.0	65	52.7	43.1	65	52.8	32.5	65	52.8	33.6	65
07	o60y	0.7	0.5	0.2	0.3	0.5	66	61.2	36.2	73	55.4	42.9	73	52.8	33.3	73	52.8	34.4	73
08	o070y	0.7	0.55	0.2	0.3	0.5	73	64.5	37.3	82	58.4	43.6	82	52.8	35.1	82	52.8	36.1	82
09	o80y	0.7	0.6	0.2	0.3	0.5	79	67.4	39.1	90	61.1	45.2	90	52.8	37.7	90	52.8	38.7	90
10	o90y	0.7	0.65	0.2	0.3	0.5	85	68.7	45.1	99	64.1	48.3	99	52.8	36.0	99	52.8	35.9	99
11	Y=y00l	0.7	0.7	0.2	0.3	0.5	90	65.8	42.8	107	64.8	45.7	107	52.8	33.8	107	52.8	34.4	107

Goal: Transfer coordinates ***olv*30*** (system m=0) to ***LCH*am*** (system m=1 to 4)
The following equations for relative blackness and chroma are valid for any device:
$n^* = 1 - max\ (o^*_{30}, l^*_{30}, v^*_{30})$ (1)
$c^* = max\ (o^*_{30}, l^*_{30}, v^*_{30}) - min\ (o^*_{30}, l^*_{30}, v^*_{30})$ (2)
For the calculation of the missing relative device hue asume
as a starting point that the three values ***olv*30*** belong to the standard (s) device SRS18:
relative red-green chroma: $a^*_{r0} = o^*_{30}\ cos(30) + l^*_{30}\ cos(150)$ (3)
relative yellow-blue chroma: $b^*_{r0} = o^*_{30}\ sin(30) + l^*_{30}\ sin(150) - v^*_{30}\ sin(270)$ (4)
Standard integer hue: $H^*_{si0} = round\ [\ atan\ (b^*_{r0} / a^*_{r0})\ ]$ (5)
Fetch device integer hue: $H^*_{ai0} = H^*_{si\_ai}\ [\ H^*_{si0}\ ]$ (6)

Fetch device data $LCH^*_{a,M0}$ from table with 361 entries for H^*_{ai0} from 0 to 360 degrees
Lightness, chroma, hue: $LCH^*_{a,M0} = LCH^*_{a,M0}\ [\ H^*_{ai0}\ ]$ (7)
Fetch device data $LCH^*_{a,Mm}$ from table with 361 entries for H^*_{ai0} from 0 to 360 degrees
lightness, chroma, hue: $LCH^*_{a,Mm} = LCH^*_{a,Mm}\ [\ H^*_{ai0}\ ]$ (8)

For any input or output device (m=0 to 4) it is valid for constant ***n*, c*, l*, H*a***:
CIELAB lightness: $L^*_m = L^*_{am} = L^*_{Nm} + l^*\ [\ L^*_{Wm} - L^*_{Nm}\ ]$ (9)
Adated CIELAB chroma: $C^*_{am} = c^*\ C^*_{a,Mm}$ (10)
Adated CIELAB hue: $H^*_{am} = H^*_{a,M0} = H^*_{a,Mm}$ (11)
Result: device dependent adapted CIELAB data of 4 systems m=1 to 4:
lightness, chroma, hue: ***LCH*am*** (12)

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