

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab^*h = 30/360 = 0.083$

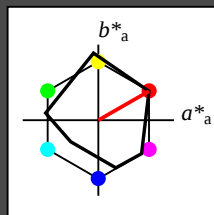
$lab^*tch$  and  $lab^*nch$

D65: hue R

LCH\*Ma: 50 77 30

rgb\*Ma: 1.0 0.0 0.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

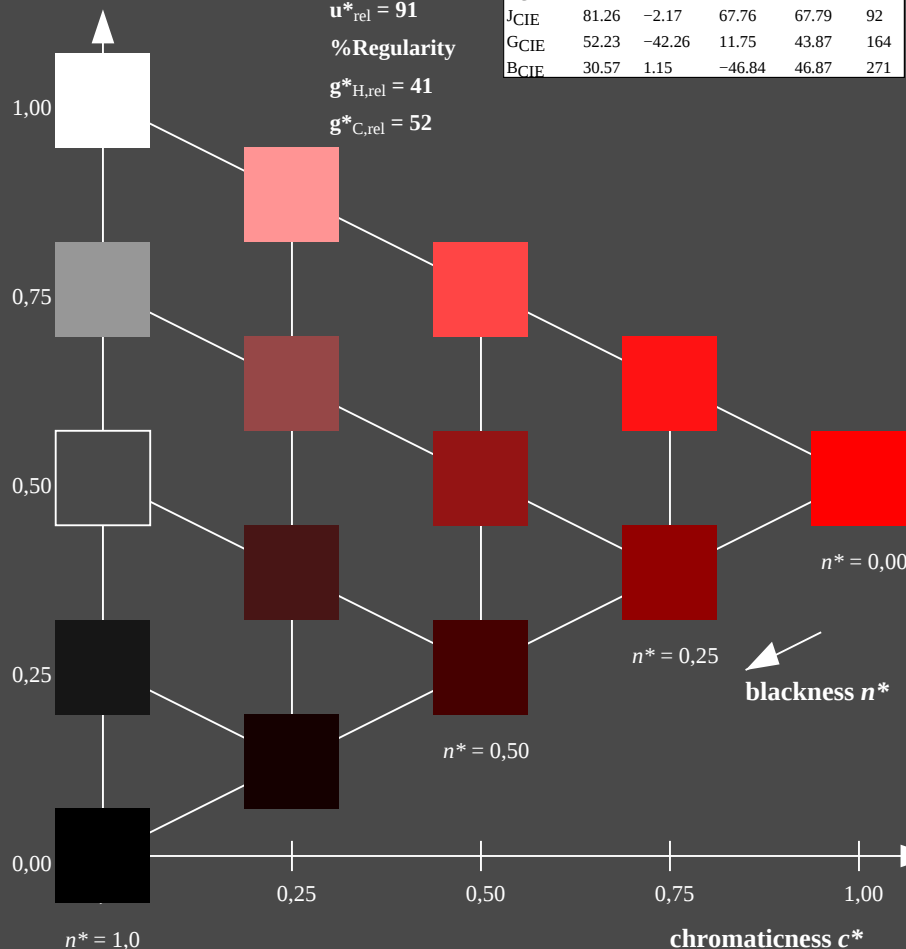
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

### MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| WCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 30/360 = 0.083 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab^*h = 24/360 = 0.066$

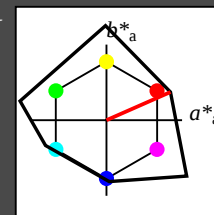
$LAB^*LCH$ ,  $LAB^*NCH$

D65: hue R

LCH\*Ma: 47 92 24

rgb\*Ma: 1.0 0.0 0.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

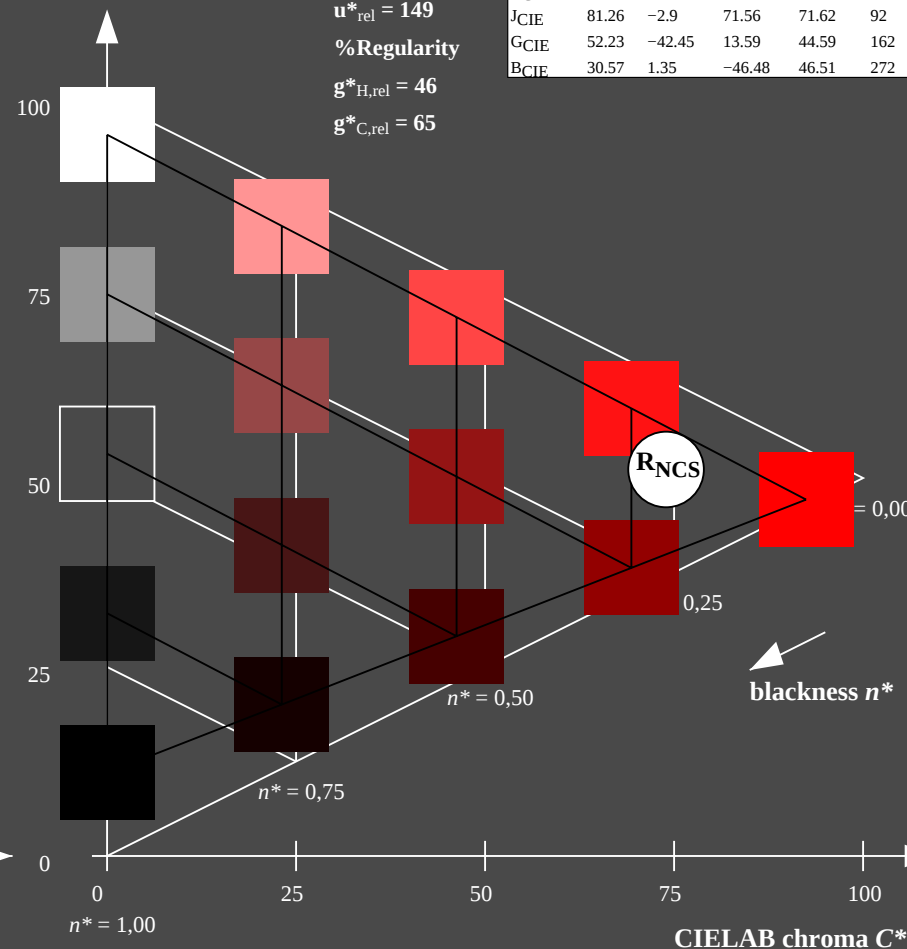
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

### NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| WCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 24/360 = 0.066 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^*setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^*setrgbcolor / w^*setgray$

# Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 94/360 = 0.261$

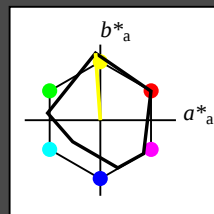
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue J

LCH\*Ma: 91 89 94

rgb\*Ma: 1.0 1.0 0.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

## MRS18; adapted (a) CIELAB data

|                    | $L^* = L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|---------------|---------|---------|--------------|--------------|
| RMa                | 49.63         | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7          | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11         | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03         | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65         | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94         | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01         | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41         | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92         | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26         | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23         | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57         | 1.15    | -46.84  | 46.87        | 271          |

# Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 91/360 = 0.252$

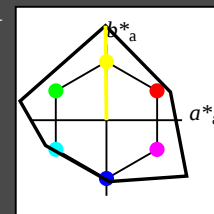
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue J

LCH\*Ma: 91 125 91

rgb\*Ma: 1.0 1.0 0.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

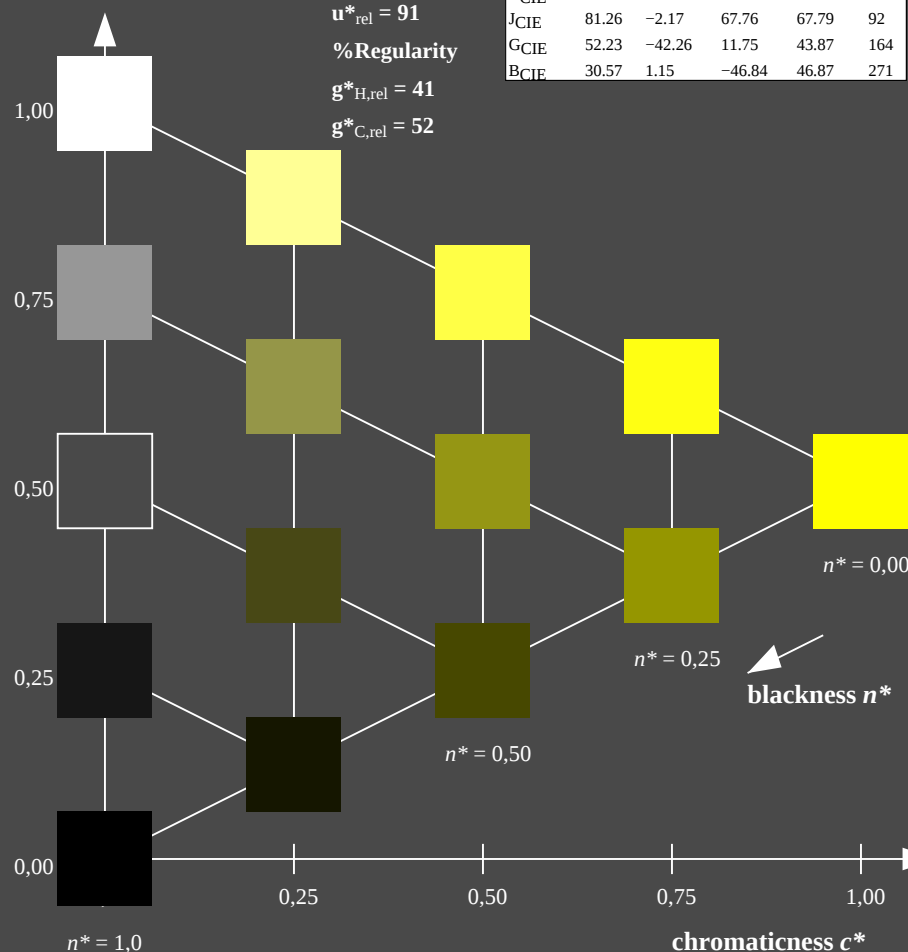
%Regularity

$g^*_{H,rel} = 46$

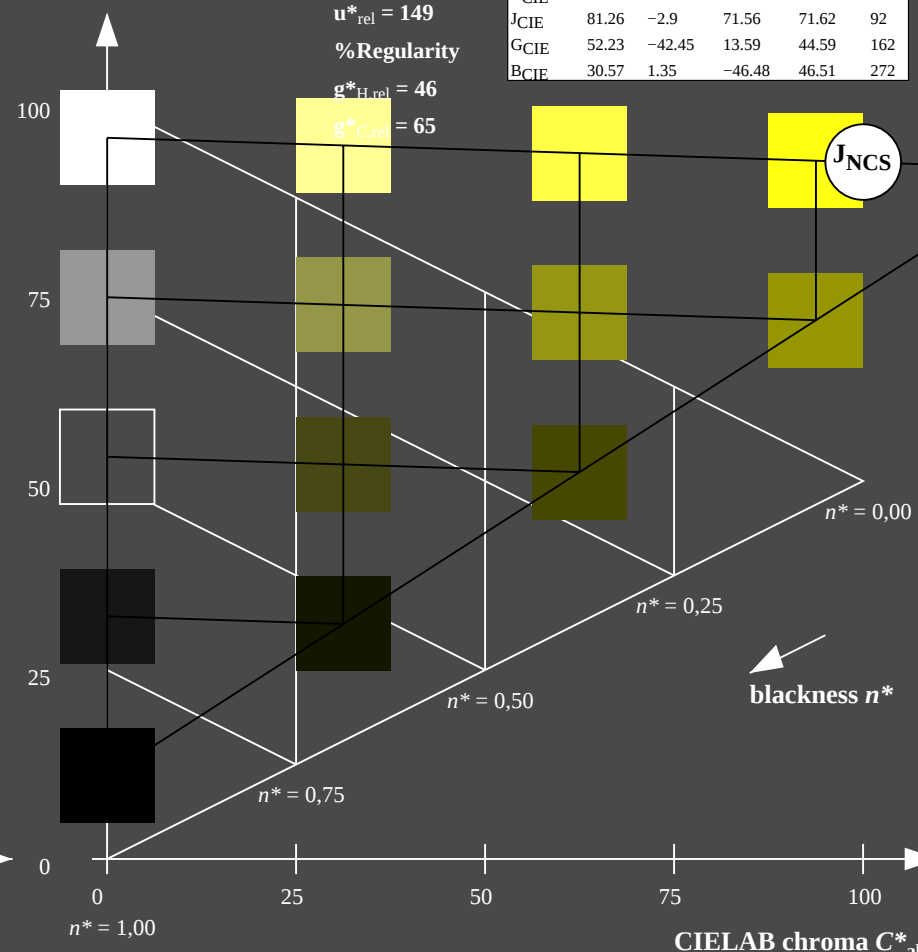
$g^*_{C,rel} = 65$

## NCS11; adapted (a) CIELAB data

|                    | $L^* = L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|---------------|---------|---------|--------------|--------------|
| RMa                | 47.15         | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37         | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07         | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47         | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01         | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06         | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99         | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41         | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92         | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26         | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23         | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57         | 1.35    | -46.48  | 46.51        | 272          |



TE230-7, 5 step scales for constant CIELAB hue 94/360 = 0.261 (left)



5 step scales for constant CIELAB hue 91/360 = 0.252 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 172/360 = 0.479$

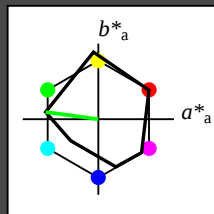
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue G

LCH\*Ma: 52 70 172

rgb\*Ma: 0.0 1.0 0.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

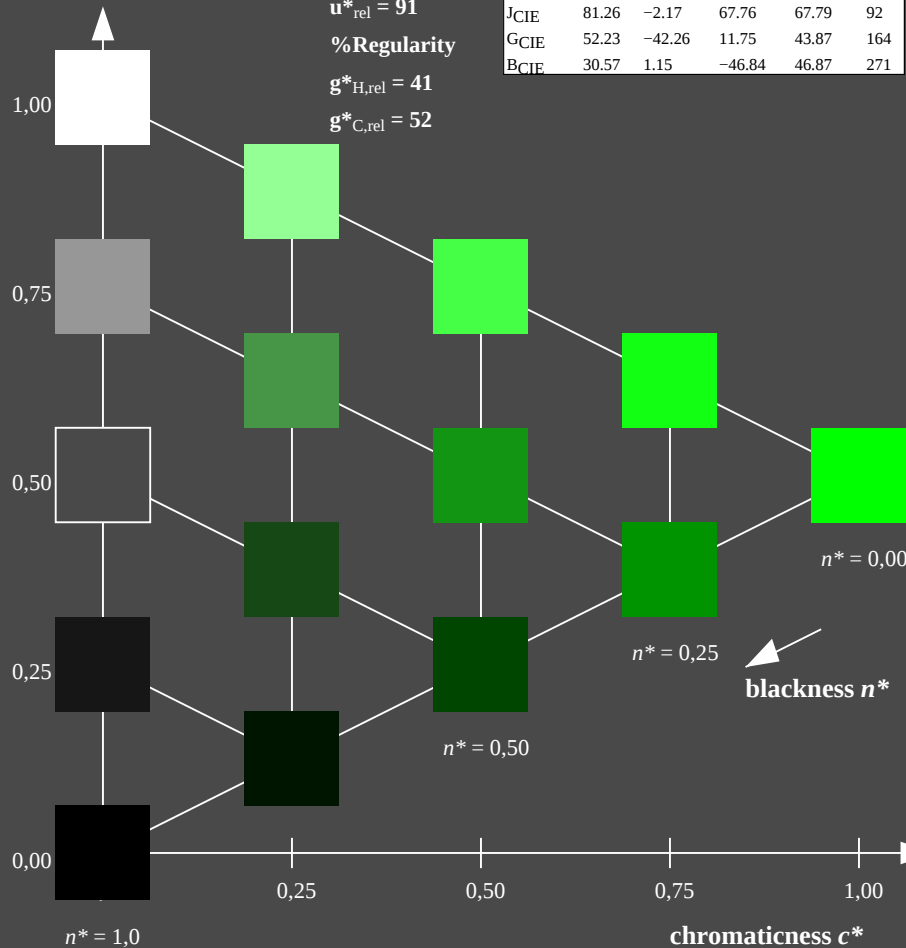
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

#### MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 172/360 = 0.479 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 167/360 = 0.465$

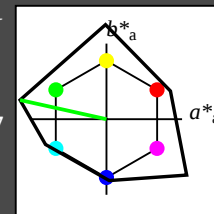
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue G

LCH\*Ma: 63 117 167

rgb\*Ma: 0.0 1.0 0.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

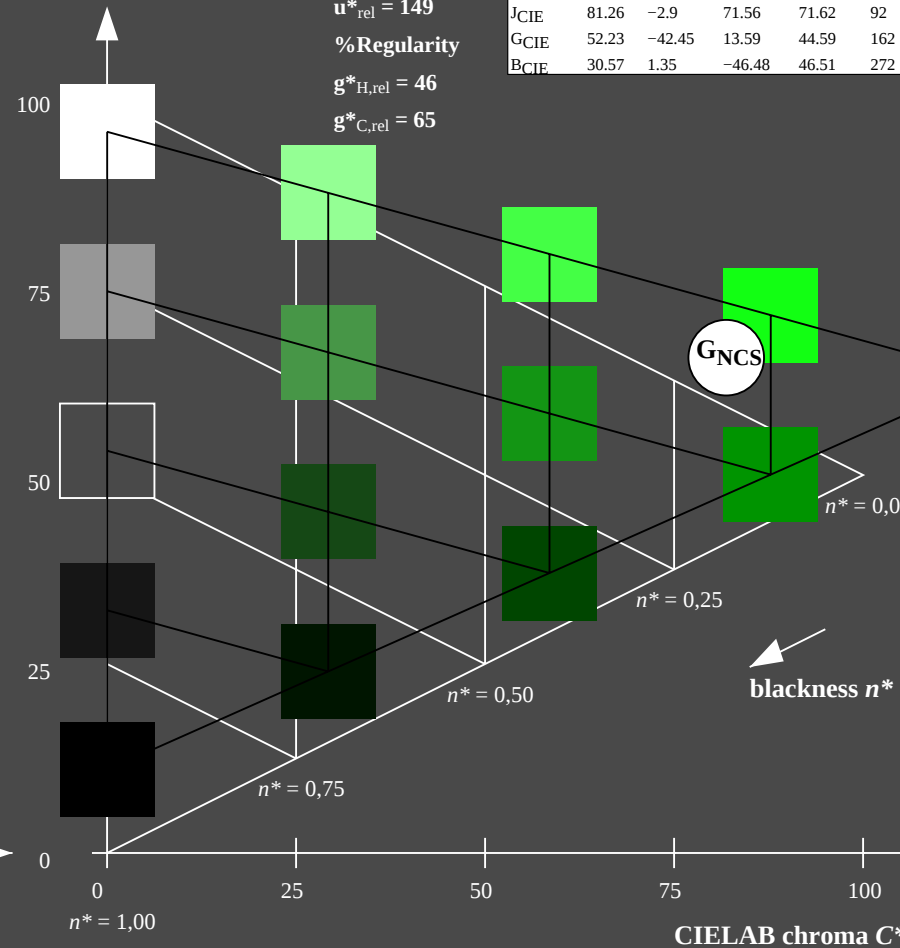
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

#### NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 167/360 = 0.465 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 218/360 = 0.605$

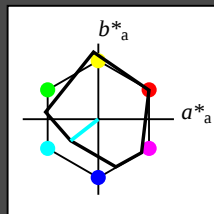
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue G50B

LCH\*Ma: 45 46 218

rgb\*Ma: 0.0 1.0 1.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

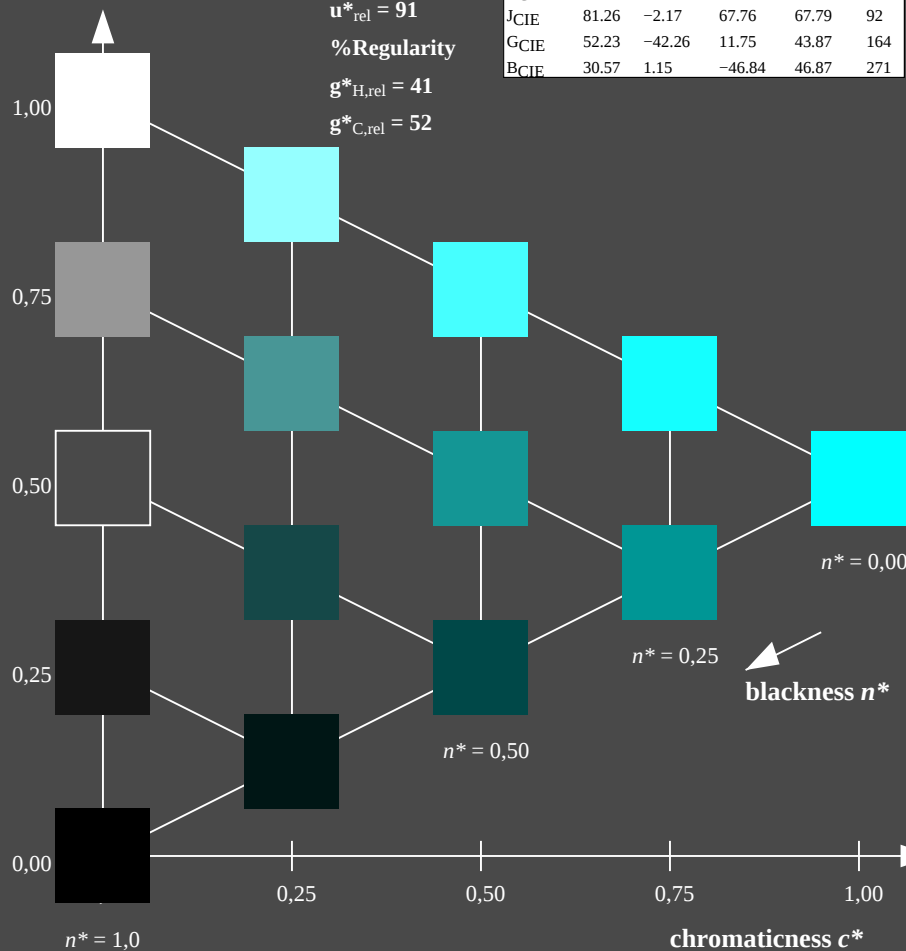
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

#### MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 218/360 = 0.605 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 203/360 = 0.563$

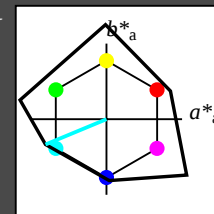
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue G50B

LCH\*Ma: 59 87 203

rgb\*Ma: 0.0 1.0 1.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

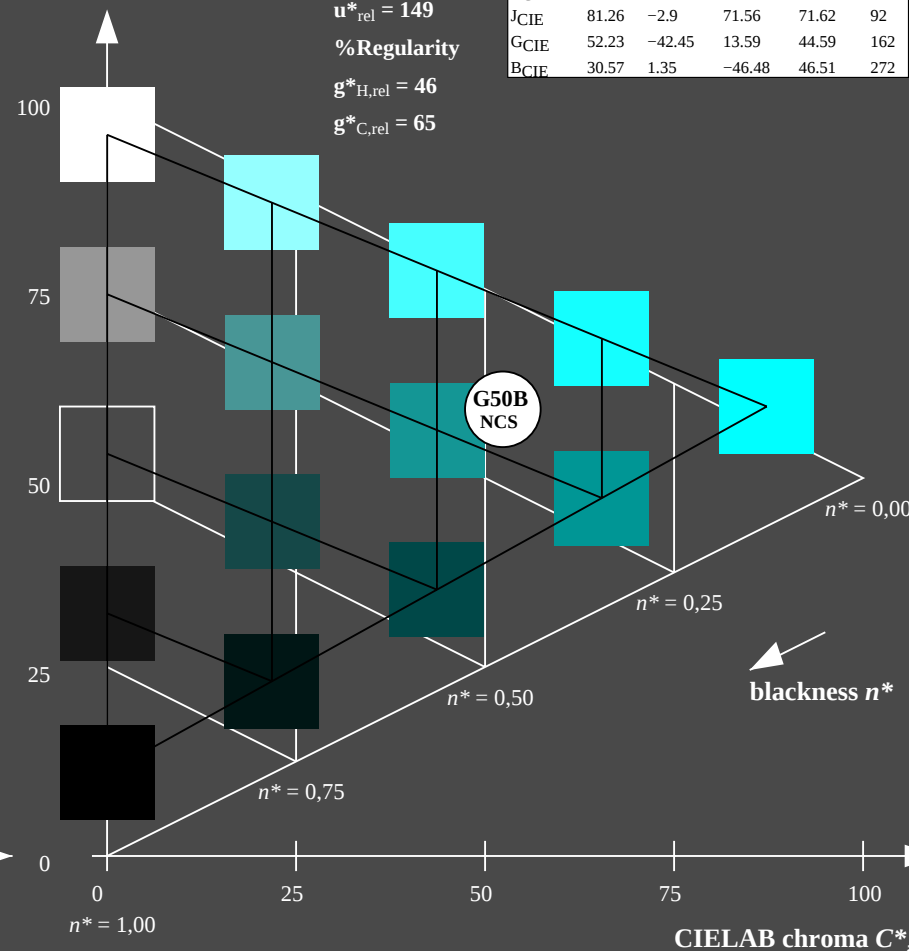
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

#### NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 203/360 = 0.563 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 290/360 = 0.806$

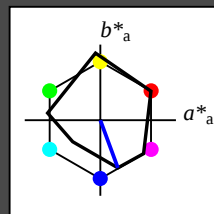
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue B

LCH\*Ma: 37 67 290

rgb\*Ma: 0.0 0.0 1.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

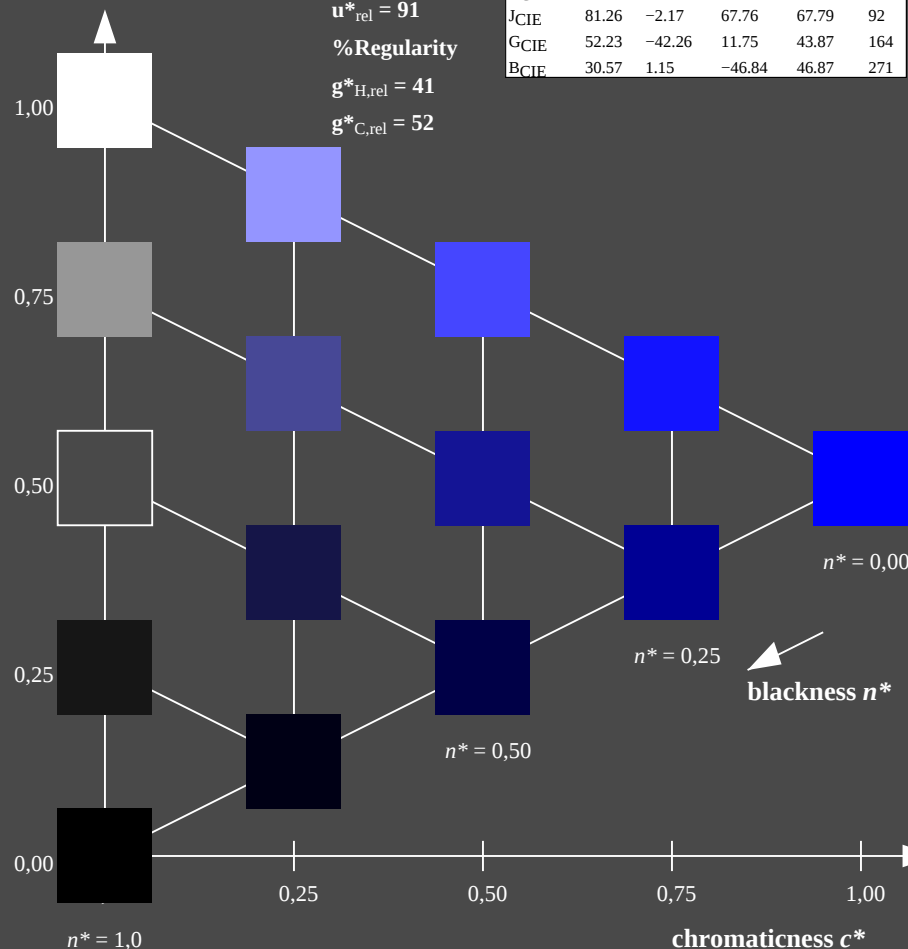
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

### MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 290/360 = 0.806 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 273/360 = 0.757$

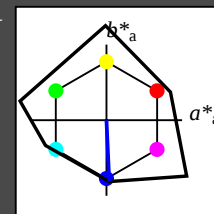
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue B

LCH\*Ma: 49 81 273

rgb\*Ma: 0.0 0.0 1.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

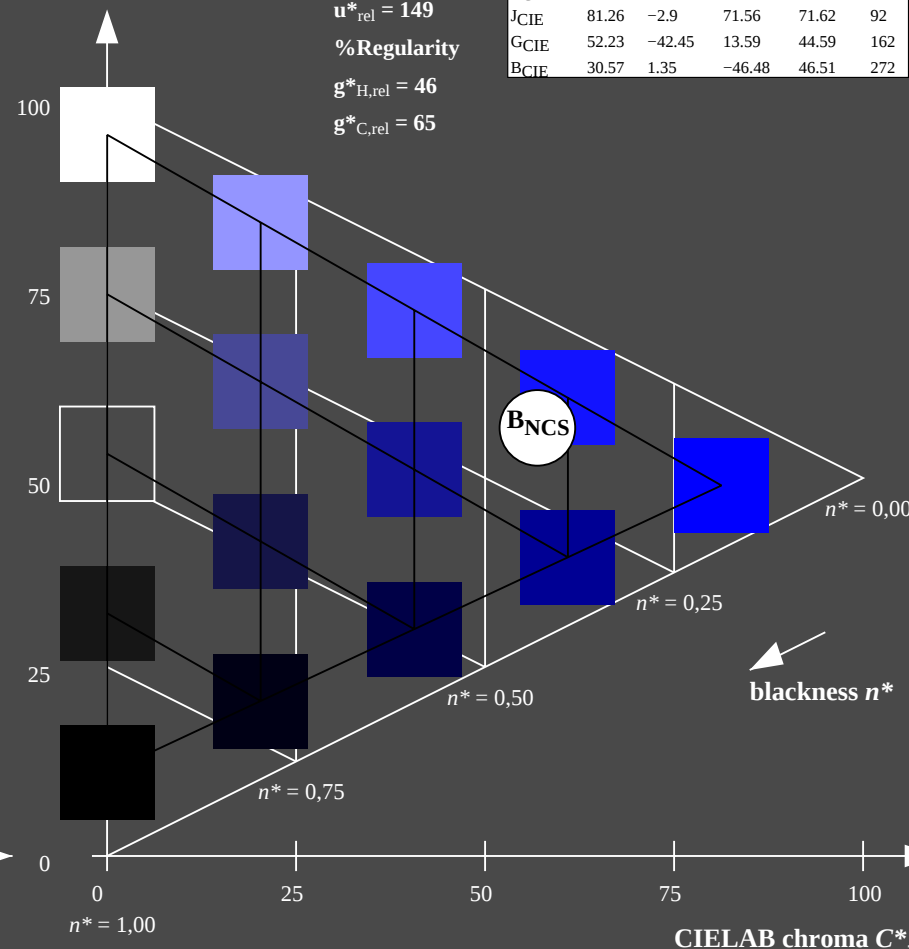
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

### NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 273/360 = 0.757 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

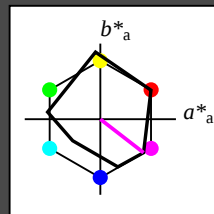


# Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 322/360 = 0.895$

$lab \cdot tch$  and  $lab \cdot nch$

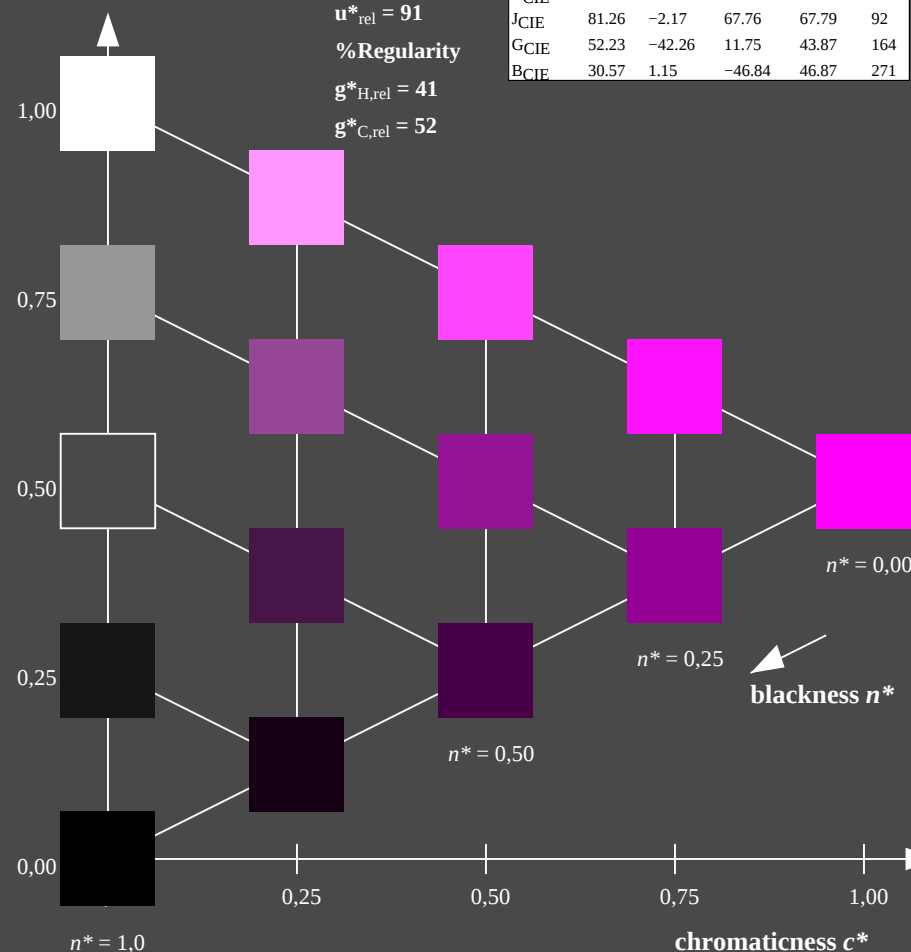
D65: hue B50R  
 LCH\*Ma: 35 72 322  
 rgb\*Ma: 1.0 0.0 1.0



## MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |

triangle lightness  $t^*$



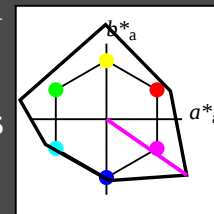
TE230-7, 5 step scales for constant CIELAB hue 322/360 = 0.895 (left)

# Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 325/360 = 0.903$

$LAB \cdot LCH$ ,  $LAB \cdot NCH$

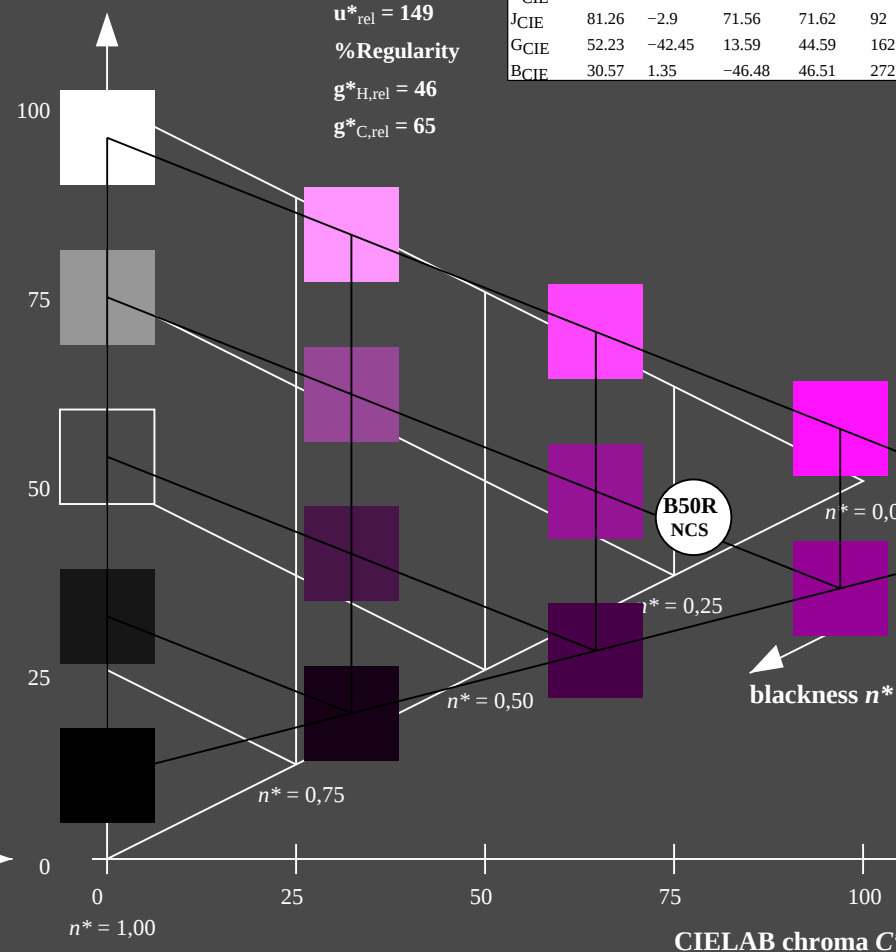
D65: hue B50R  
 LCH\*Ma: 44 129 325  
 rgb\*Ma: 1.0 0.0 1.0



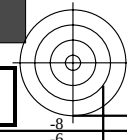
## NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |

CIELAB lightness  $L^*$



5 step scales for constant CIELAB hue 325/360 = 0.903 (right)



**Input: Colorimetric Reflective System MRS18**

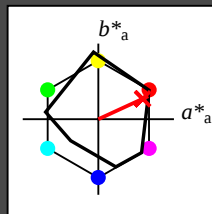
for hue  $h^* = lab^*h = 25/360 = 0.069$

***lab\*tch* and *lab\*nch***

D65: hue R

**LCH\*Ma: 48 73 25**

**rgb\*Ma: 1.0 0.0 0.1**



### %Gamut

$$\mathbf{u}_{\text{rel}}^* = 91$$

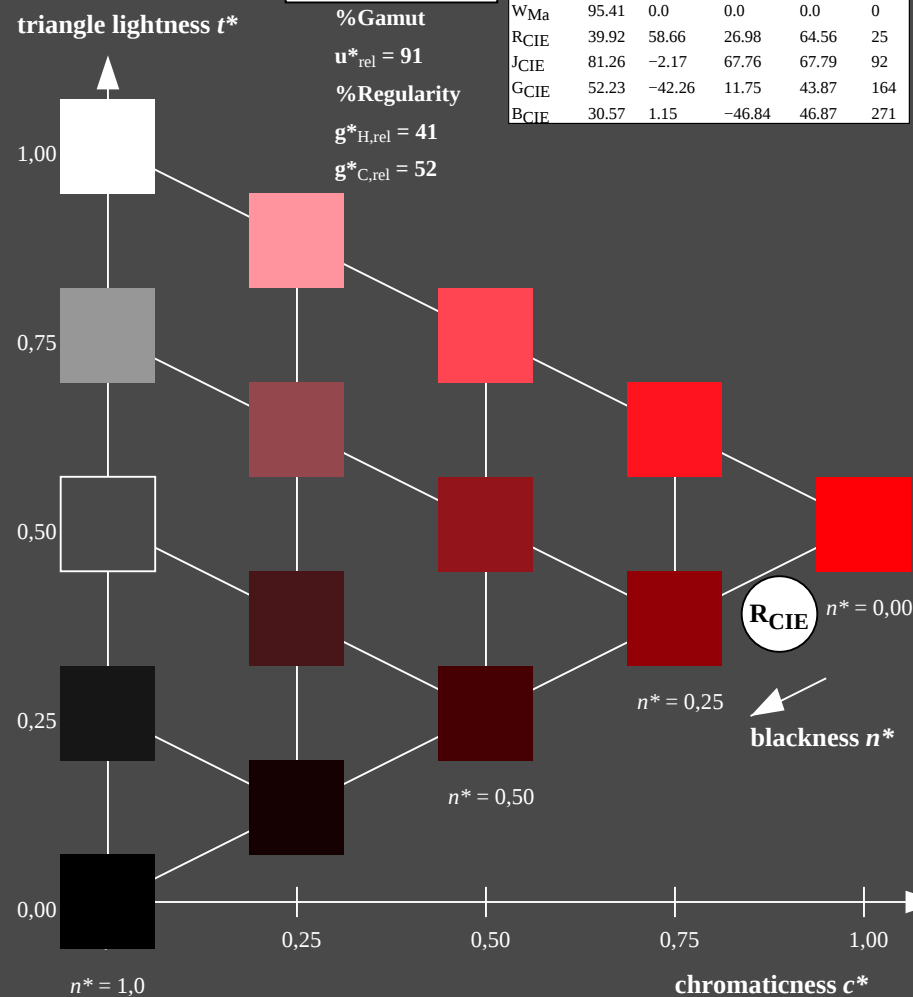
### %Regularity

$$g^*_{H,rel} = 41$$
$$g^*_{C,rel} = 52$$

Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses increased with the number of trials. The number of correct responses was significantly higher than the number of incorrect responses for all trial numbers.

MRS18; adapted (a) CIELAB data

|                    | $L^*=L_a^* a_a^*$ | $b_a^*$ | $C_{ab,a}^*$ | $h_{ab,a}^*$ |     |
|--------------------|-------------------|---------|--------------|--------------|-----|
| R <sub>Ma</sub>    | 49.63             | 66.96   | 38.37        | 77.18        | 30  |
| J <sub>Ma</sub>    | 90.7              | -6.36   | 88.75        | 88.98        | 94  |
| G <sub>Ma</sub>    | 52.11             | -69.73  | 9.44         | 70.37        | 172 |
| G50B <sub>Ma</sub> | 45.03             | -36.57  | -28.47       | 46.36        | 218 |
| B <sub>Ma</sub>    | 36.65             | 23.19   | -63.05       | 67.18        | 290 |
| B50R <sub>Ma</sub> | 34.94             | 57.17   | -44.26       | 72.31        | 322 |
| N <sub>Ma</sub>    | 18.01             | 0.0     | 0.0          | 0.0          | 0   |
| W <sub>Ma</sub>    | 95.41             | 0.0     | 0.0          | 0.0          | 0   |
| RCIE               | 39.92             | 58.66   | 26.98        | 64.56        | 25  |
| J <sub>CIE</sub>   | 81.26             | -2.17   | 67.76        | 67.79        | 92  |
| GCIE               | 52.23             | -42.26  | 11.75        | 43.87        | 164 |
| BCIE               | 30.57             | 1.15    | -46.84       | 46.87        | 271 |



TE230-7, 5 step scales for constant CIELAB hue 25/360 = 0.069 (left)



BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input: *olv\* setrgbcolor*

### D65: Coordinate systems of 5 step colour scales for 10 hues

### Output: Colorimetric Reflective System NCS11

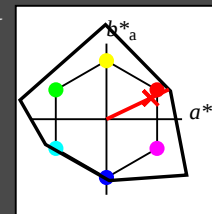
**for hue  $h^* = lab^*h = 25/360 = 0.071$**

***LAB\*LCH, LAB\*NCH***

### D65: hue R

LCH\*Ma: 48 91 25

**rgb\*Ma: 1.0 0.02 0.0**



**% Gamut**

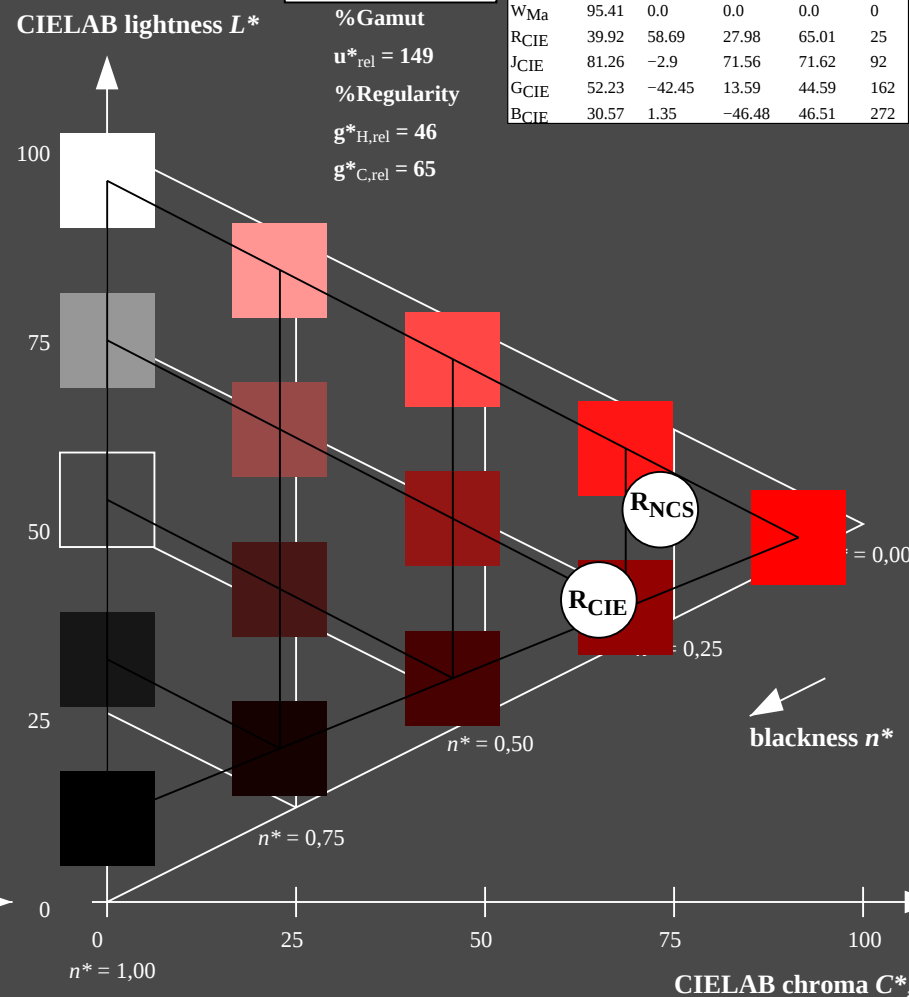
$$\mathbf{u}_{rel}^* = 149$$

### %Regularity

$$g^*_{H,rel} = 46$$
$$g^*_{C,rel} = 65$$

**NCS11; adapted (a) CIELAB data**

|                    | $L^* = L_a^*$ | $a_a^*$ | $b_a^*$ | $C_{ab,a}^*$ | $h_{ab,a}^*$ |
|--------------------|---------------|---------|---------|--------------|--------------|
| R <sub>Ma</sub>    | 47.15         | 84.64   | 37.25   | 92.48        | 24           |
| J <sub>Ma</sub>    | 91.37         | -1.27   | 125.03  | 125.03       | 91           |
| G <sub>Ma</sub>    | 63.07         | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47         | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01         | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06         | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99         | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41         | 0.0     | 0.0     | 0.0          | 0            |
| R <sub>CIE</sub>   | 39.92         | 58.69   | 27.98   | 65.01        | 25           |
| J <sub>CIE</sub>   | 81.26         | -2.9    | 71.56   | 71.62        | 92           |
| G <sub>CIE</sub>   | 52.23         | -42.45  | 13.59   | 44.59        | 162          |
| B <sub>CIE</sub>   | 30.57         | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 25/360 = 0.071 (right)



output: *olv\** *setrgbcolor* / *w\** *setgray*

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 92/360 = 0.255$

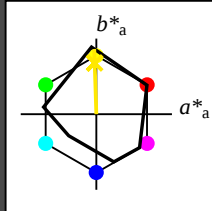
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue J

LCH\*Ma: 89 86 92

rgb\*Ma: 1.0 0.95 0.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

#### MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 92/360 = 0.256$

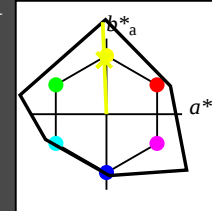
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue J

LCH\*Ma: 90 122 92

rgb\*Ma: 0.97 1.0 0.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

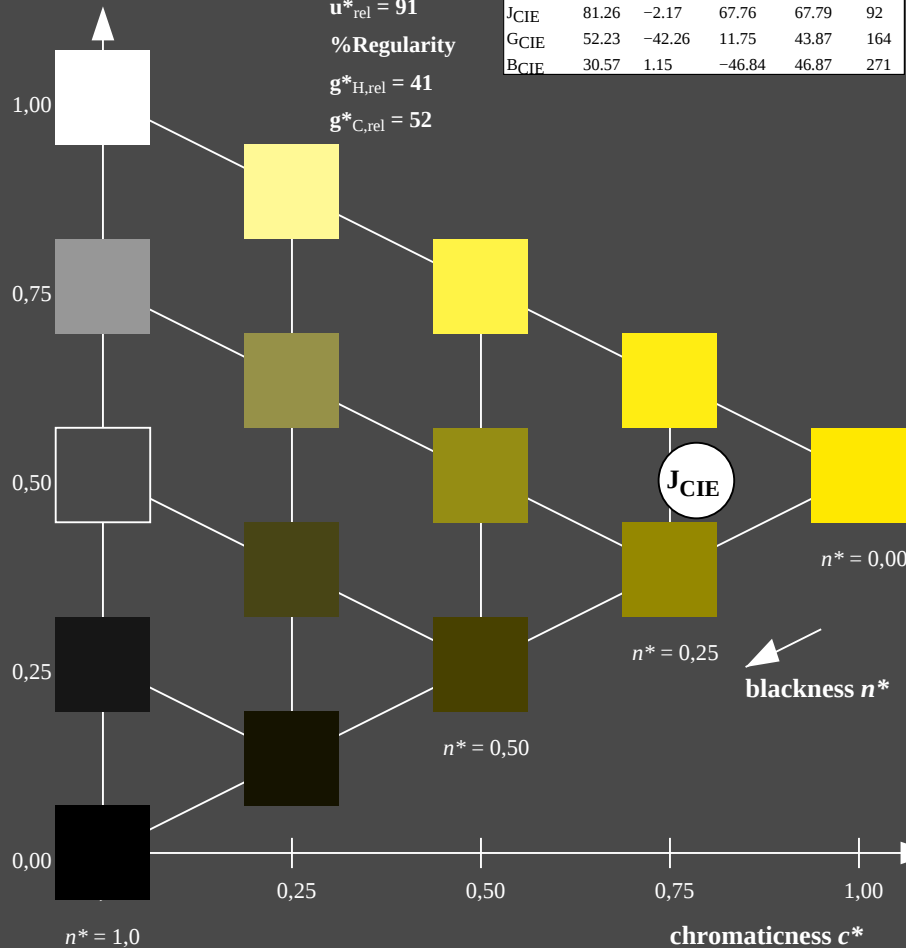
%Regularity

$g^*_{H,rel} = 46$

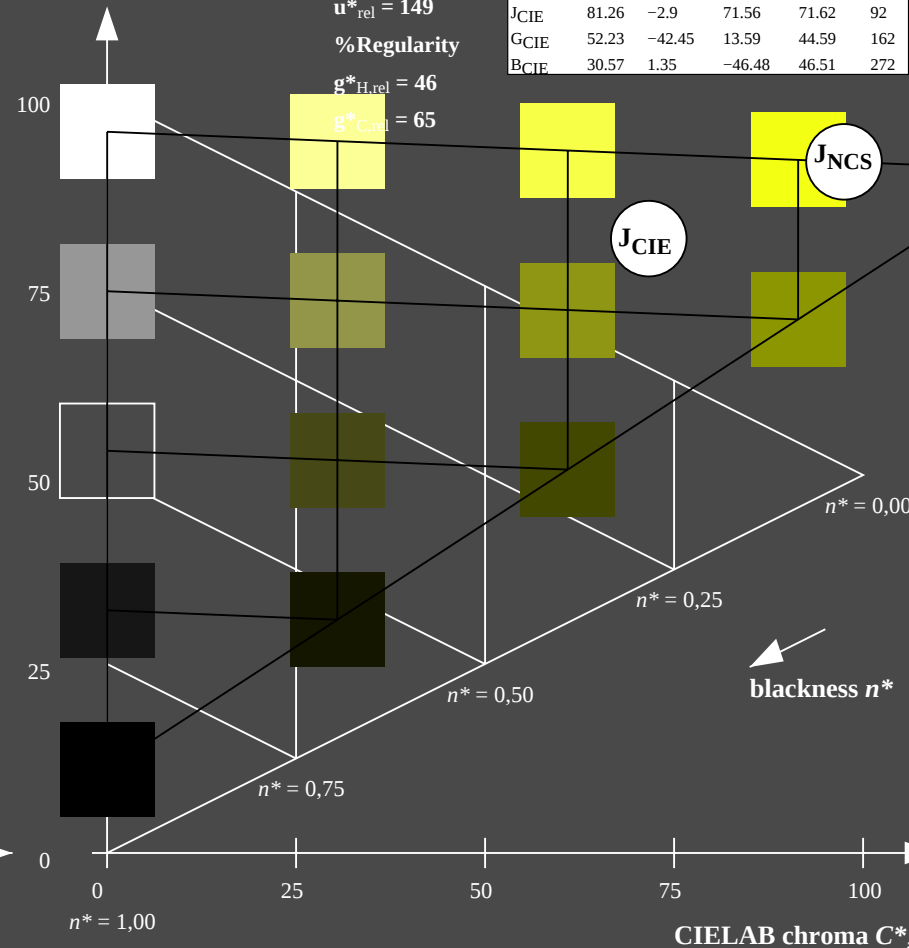
$g^*_{C,rel} = 65$

#### NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



TE230-7, 5 step scales for constant CIELAB hue 92/360 = 0.255 (left)



5 step scales for constant CIELAB hue 92/360 = 0.256 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 164/360 = 0.457$

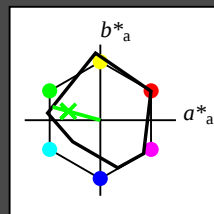
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue G

LCH\*Ma: 56 66 164

rgb\*Ma: 0.1 1.0 0.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

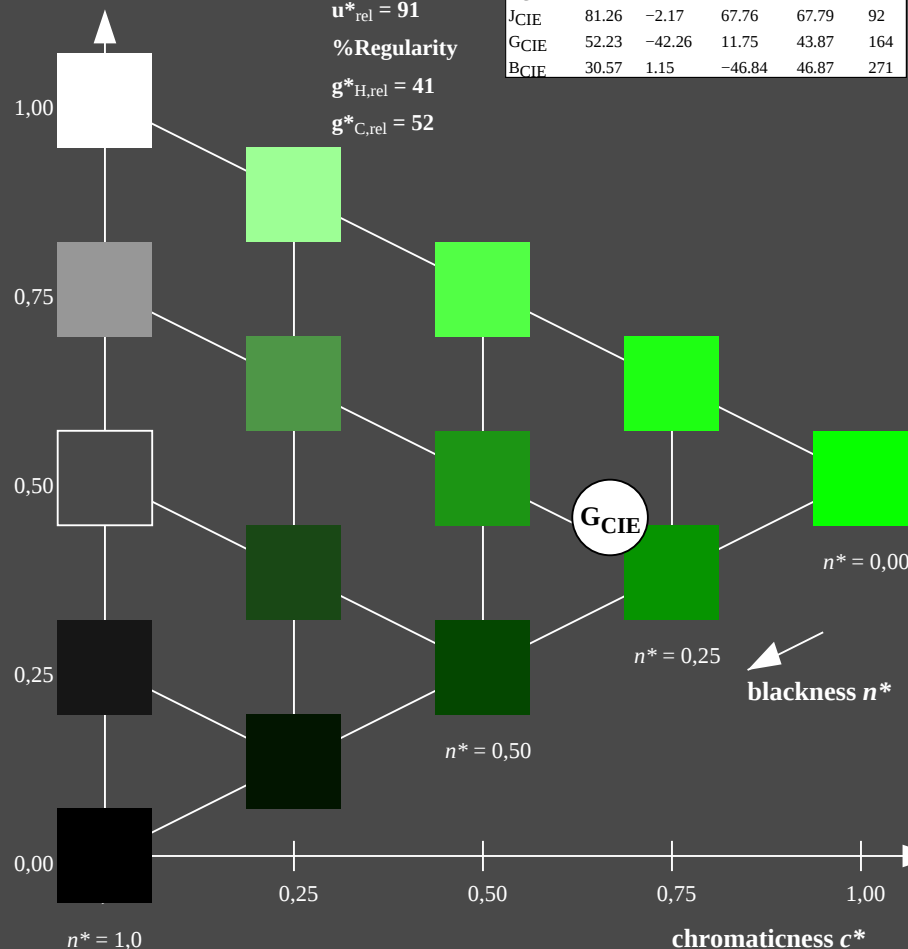
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

#### MRS18; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa                | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa                | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50B <sub>Ma</sub> | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| B <sub>Ma</sub>    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50R <sub>Ma</sub> | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| N <sub>Ma</sub>    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE               | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE               | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE               | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 164/360 = 0.457 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 162/360 = 0.451$

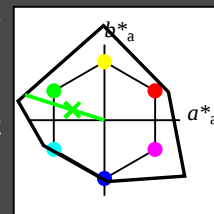
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue G

LCH\*Ma: 65 110 162

rgb\*Ma: 0.08 1.0 0.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

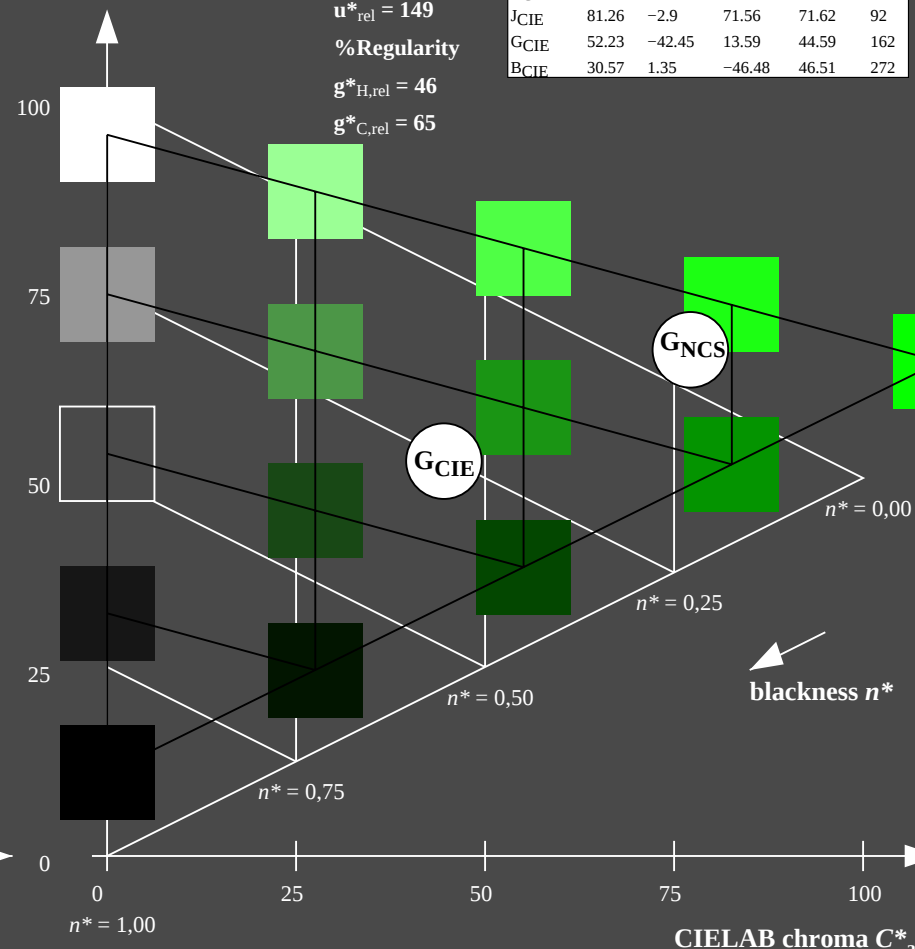
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

#### NCS11; adapted (a) CIELAB data

|                    | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------------------|-------------|---------|---------|--------------|--------------|
| RMa                | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa                | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa                | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50B <sub>Ma</sub> | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| B <sub>Ma</sub>    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50R <sub>Ma</sub> | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| N <sub>Ma</sub>    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| W <sub>Ma</sub>    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE               | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE               | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE               | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE               | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 162/360 = 0.451 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$

### Input: Colorimetric Reflective System MRS18

for hue  $h^* = lab \cdot h = 271/360 = 0.754$

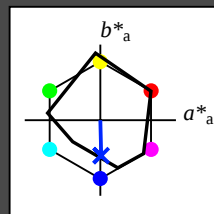
$lab \cdot tch$  and  $lab \cdot nch$

D65: hue B

LCH\*Ma: 40 50 271

rgb\*Ma: 0.0 0.37 1.0

triangle lightness  $t^*$



%Gamut

$u^*_{rel} = 91$

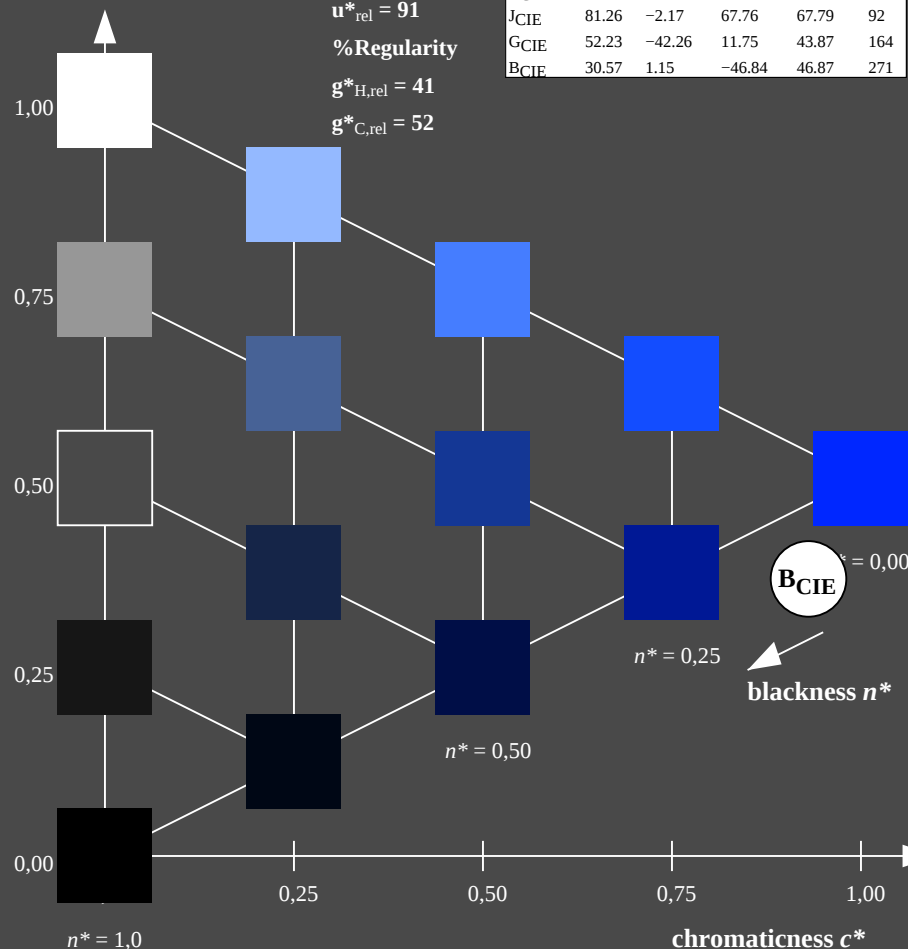
%Regularity

$g^*_{H,rel} = 41$

$g^*_{C,rel} = 52$

#### MRS18; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 49.63       | 66.96   | 38.37   | 77.18        | 30           |
| JMa    | 90.7        | -6.36   | 88.75   | 88.98        | 94           |
| GMa    | 52.11       | -69.73  | 9.44    | 70.37        | 172          |
| G50BMa | 45.03       | -36.57  | -28.47  | 46.36        | 218          |
| BMa    | 36.65       | 23.19   | -63.05  | 67.18        | 290          |
| B50RMa | 34.94       | 57.17   | -44.26  | 72.31        | 322          |
| NMa    | 18.01       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.66   | 26.98   | 64.56        | 25           |
| JCIE   | 81.26       | -2.17   | 67.76   | 67.79        | 92           |
| GCIE   | 52.23       | -42.26  | 11.75   | 43.87        | 164          |
| BCIE   | 30.57       | 1.15    | -46.84  | 46.87        | 271          |



TE230-7, 5 step scales for constant CIELAB hue 271/360 = 0.754 (left)

### Output: Colorimetric Reflective System NCS11

for hue  $h^* = lab \cdot h = 272/360 = 0.755$

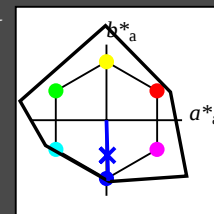
$LAB \cdot LCH$ ,  $LAB \cdot NCH$

D65: hue B

LCH\*Ma: 49 80 272

rgb\*Ma: 0.0 0.02 1.0

CIELAB lightness  $L^*$



%Gamut

$u^*_{rel} = 149$

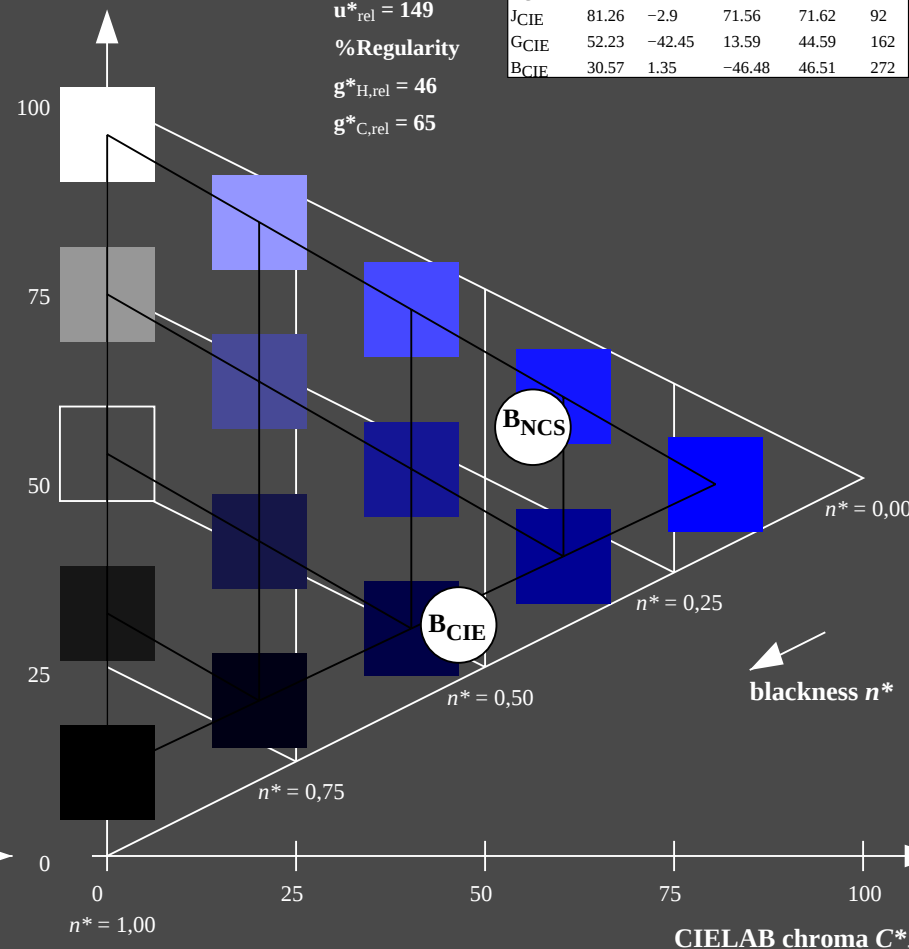
%Regularity

$g^*_{H,rel} = 46$

$g^*_{C,rel} = 65$

#### NCS11; adapted (a) CIELAB data

|        | $L^*=L^*_a$ | $a^*_a$ | $b^*_a$ | $C^*_{ab,a}$ | $h^*_{ab,a}$ |
|--------|-------------|---------|---------|--------------|--------------|
| RMa    | 47.15       | 84.64   | 37.25   | 92.48        | 24           |
| JMa    | 91.37       | -1.27   | 125.03  | 125.03       | 91           |
| GMa    | 63.07       | -114.28 | 25.35   | 117.06       | 167          |
| G50BMa | 59.47       | -80.6   | -33.45  | 87.28        | 203          |
| BMa    | 49.01       | 3.65    | -81.19  | 81.28        | 273          |
| B50RMa | 44.06       | 106.09  | -73.93  | 129.32       | 325          |
| NMa    | 10.99       | 0.0     | 0.0     | 0.0          | 0            |
| WMa    | 95.41       | 0.0     | 0.0     | 0.0          | 0            |
| RCIE   | 39.92       | 58.69   | 27.98   | 65.01        | 25           |
| JCIE   | 81.26       | -2.9    | 71.56   | 71.62        | 92           |
| GCIE   | 52.23       | -42.45  | 13.59   | 44.59        | 162          |
| BCIE   | 30.57       | 1.35    | -46.48  | 46.51        | 272          |



5 step scales for constant CIELAB hue 272/360 = 0.755 (right)

BAM-test chart TE23; Colorimetric systems MRS18 & NCS11a input:  $olv^* \cdot setrgbcolor$

D65: Coordinate systems of 5 step colour scales for 10 hues

output:  $olv^* \cdot setrgbcolor / w^* \cdot setgray$