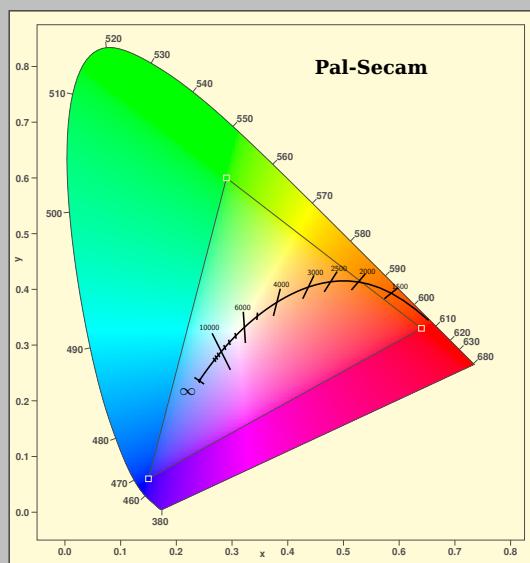


# PSTricks

## **pst-cie: CIE xy chromaticity space**

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## 1 Introduction

Using data (CIE XYZ CIE XYZ 1931 and 1964) from the International Commission on Illumination (Commission internationale de l'éclairage) the package `pst-cie` proposes to represent the color table and / or the chromaticity diagram for different color spaces. Web page devoted to studies and performances diagrams and chromaticity tables are numerous and it is difficult to distinguish one over another, however here are some important informations: [Frédéric Legrand](#) devoted to colorimetry, and those of Daniel Metz. Yu-Chang Sung realized with the software Mathematica an interactive version of beauty: [CIEChromaticityDiagram](#) as I do not own this software I tried to do pretty much the same with PSTricks, or at least having almost the same functionality.

The macro `\psChromaticityDiagram [Options]` supports the following optional arguments:

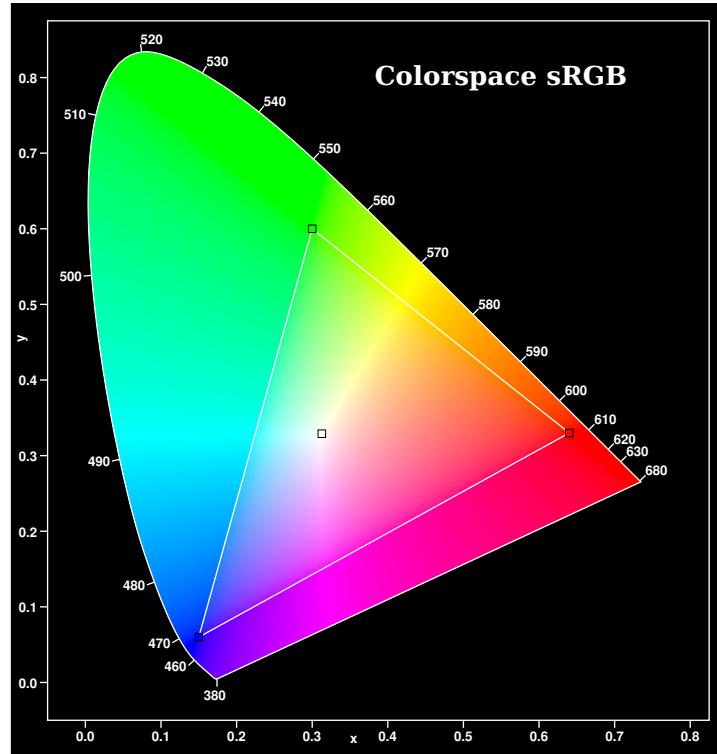
Option	Type	Default	Description
gamma	number	2.2	color correction
contrast	number	1	$0 < \text{contrast} \leq 1$
ColorSpace	name	sRGB	colorspace
datas	name	CIE1931	CIE
primaries	boolean	true	show primary points
trianglecolor	color	black	color of the triangle
bgcolor	color	black	background color
textcolor	color	white	textcolor
Planck	boolean	false	draw the Planck' locus
showcontour	boolean	false	show the contour of the color space, only useful for using <code>\pstPlanck</code> .
Tfontsize	length	4pt	fontsize for the temperature of the Planck curve
unit	number	1	unit depending to the default size of $10\text{cm} \times 10\text{cm}$
PSfont	PS font	Helvetica-Bold	
fontscale	5	PS font scale in pt	

The color spaces which are available are: Adobe, CIE, ColorMatch, NTSC, Pal-Secam, ProPhoto, SMPTE, and sRGB.

Tabulated values available are those of the CIE XYZ 1931 and the CIE XYZ 1964. A low value of the contrast will highlight the work area of the system displayed the colors it can represent, it is the triangle with vertices the points of primary colors included in the *Iron horse* which represents all the colors visible to the human eye.

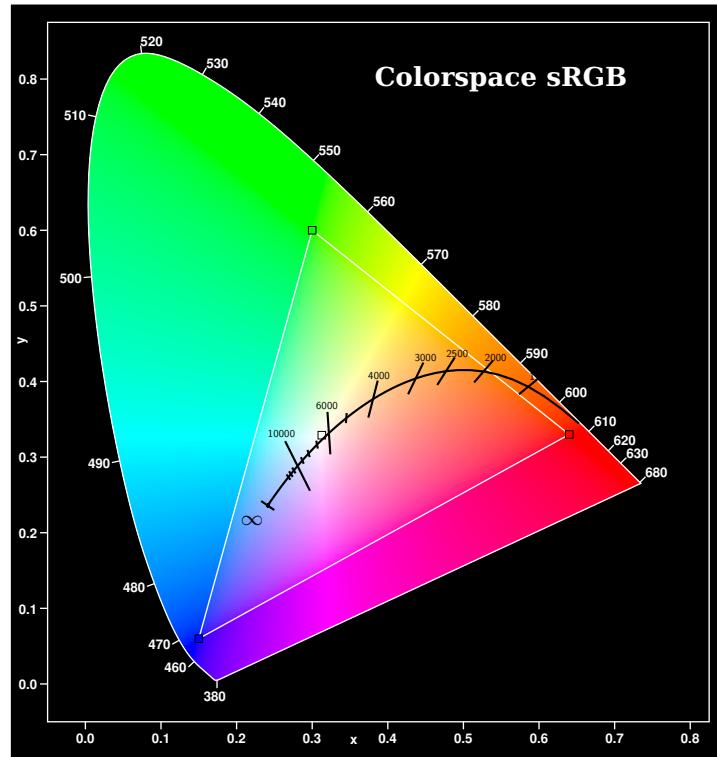
**2 Examples**

	Red	Green	Blue	White
x	0.6400	0.3000	0.1500	0.3127
y	0.3300	0.6000	0.0600	0.3290



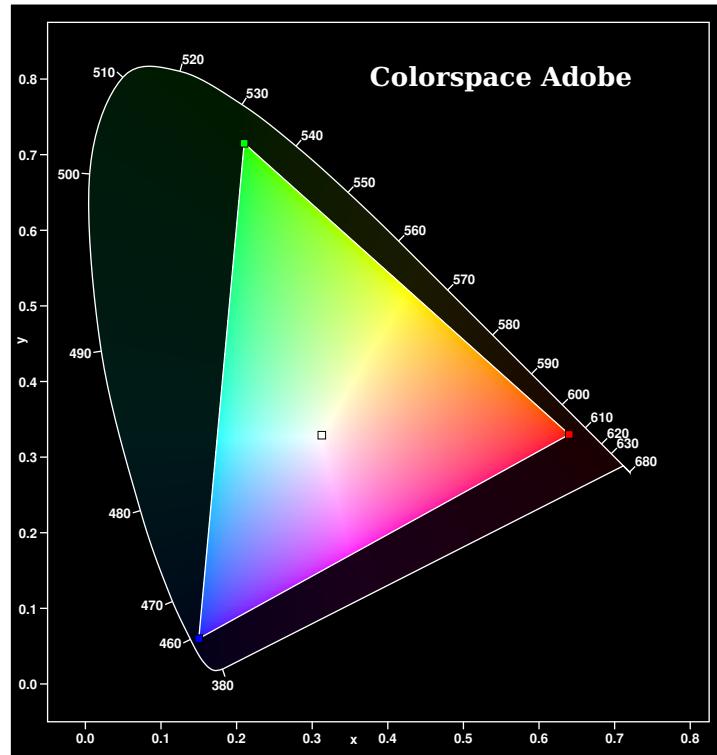
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram
\rput(5.5,8){\white \textbf{Colorspace sRGB}}
\rput(4,10){\tiny \verb|\tabsRGB|}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.6400	0.3000	0.1500	0.3127
y	0.3300	0.6000	0.0600	0.3290



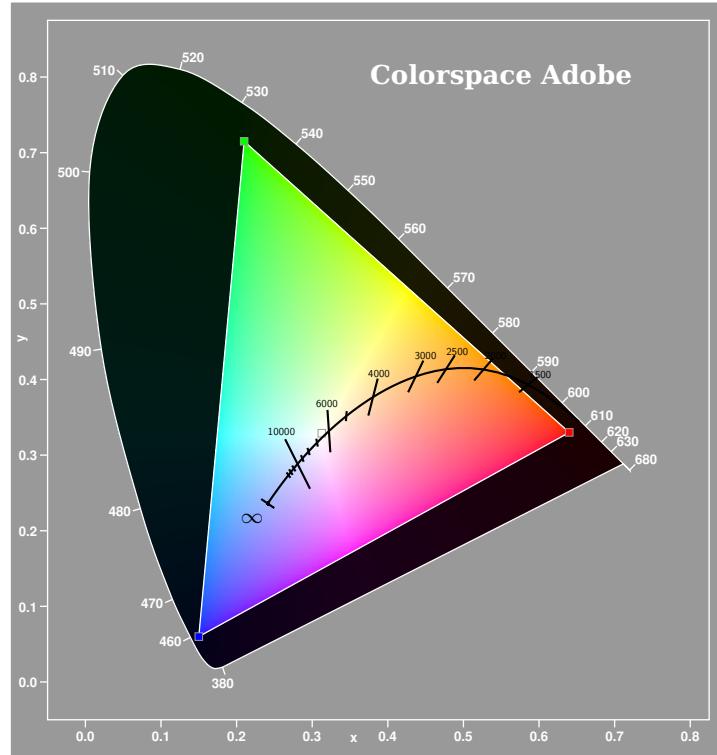
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[Planck,trianglecolor=black]
\rput(5.5,8){\white \textbf{Colorspace sRGB}}
\rput(4,10){\tiny\tabsRGB}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.6400	0.2100	0.1500	0.3127
y	0.3300	0.7150	0.0600	0.3290



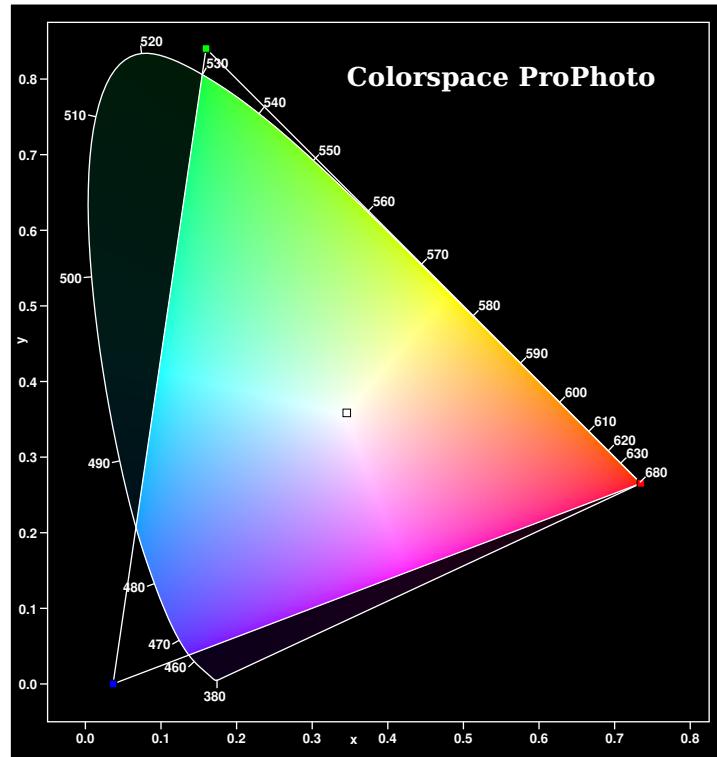
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[datas=CIE1964,ColorSpace=Adobe,contrast=0.1]
\rput(5.5,8){\white \textbf{Colorspace Adobe}}
\rput(4,10){\tabAdobe}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.6400	0.2100	0.1500	0.3127
y	0.3300	0.7150	0.0600	0.3290



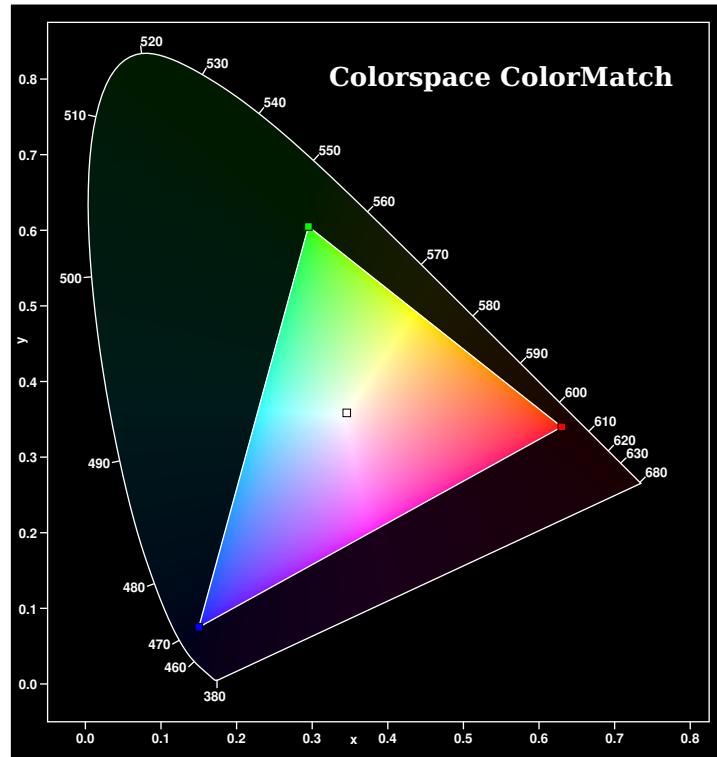
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[Planck, bgcolor=black!40, datas=CIE1964,
    ColorSpace=Adobe, contrast=0.1]
\rput(5.5,8){\white \textbf{Colorspace Adobe}}
\rput(4,10){\tabAdobe}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.7347	0.1596	0.0366	0.3457
y	0.2653	0.8404	0.0001	0.3585



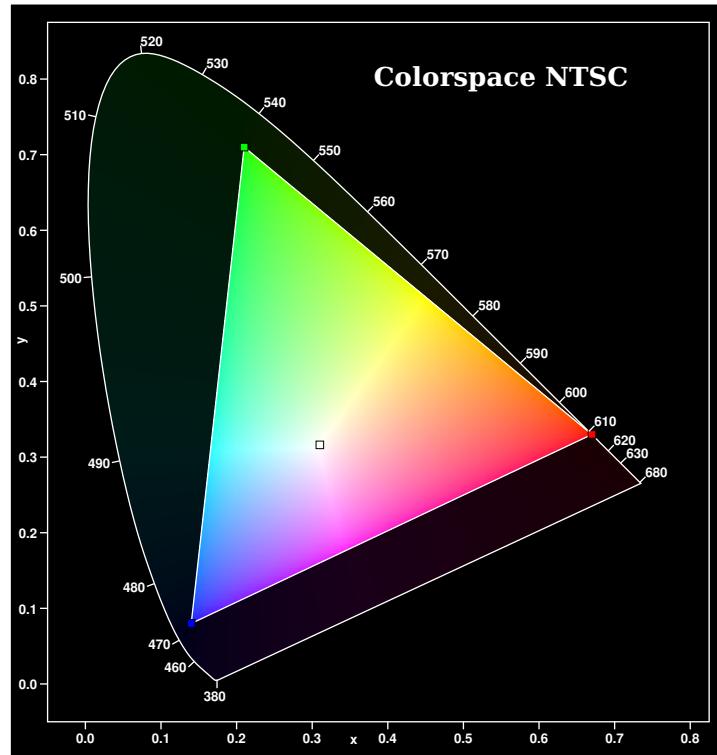
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[ColorSpace=ProPhoto,contrast=0.1]
\rput(5.5,8){\white \textbf{Colorspace ProPhoto}}
\rput(4,10){\tabProPhoto}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.6300	0.2950	0.1500	0.3457
y	0.3400	0.6050	0.0750	0.3585



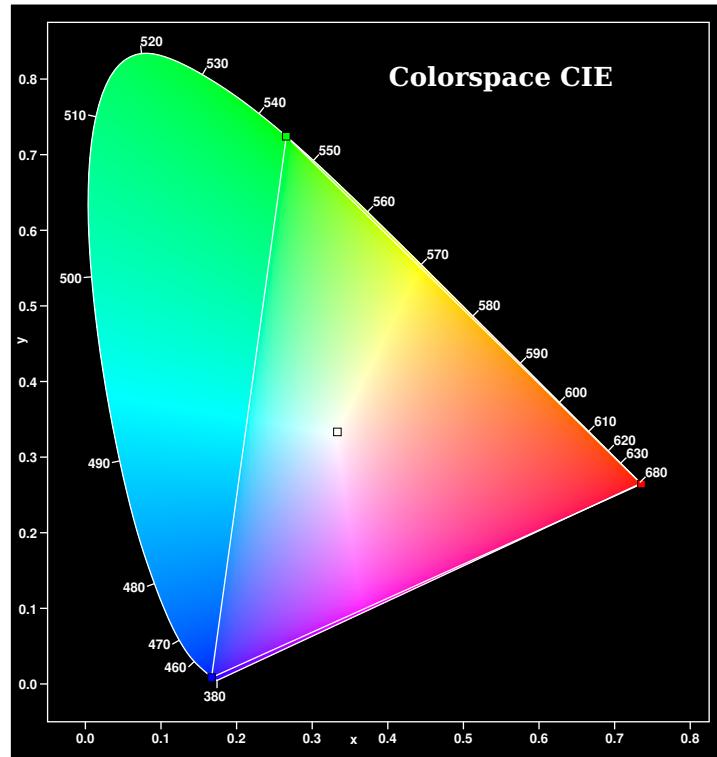
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[ColorSpace=ColorMatch,contrast=0.1]
\rput(5.5,8){\white \textbf{Colorspace ColorMatch}}
\rput(4,10){\tabColorMatch}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.6700	0.2100	0.1400	0.3101
y	0.3300	0.7100	0.0800	0.3162



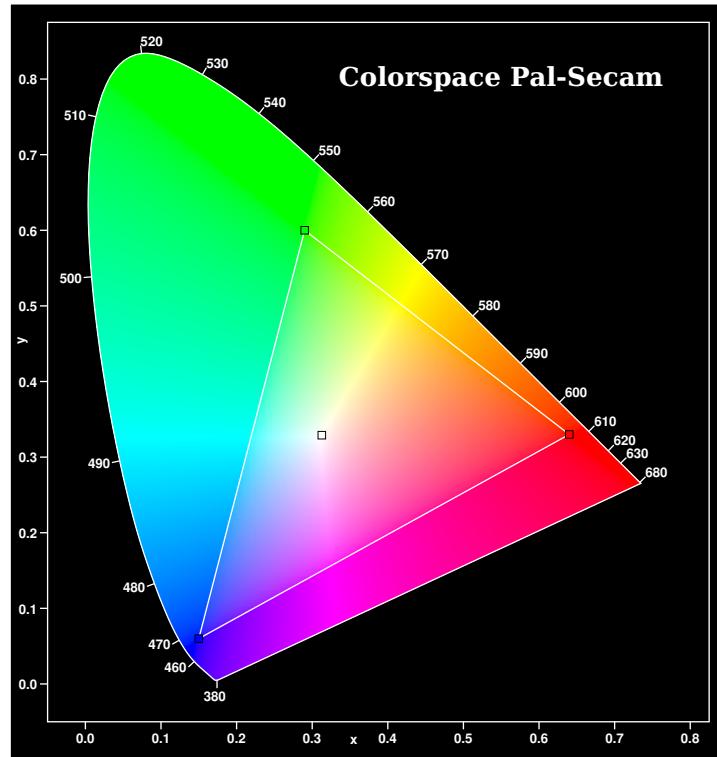
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[ColorSpace=NTSC,contrast=0.1]
\rput(5.5,8){\white \textbf{Colorspace NTSC}}
\rput(4,10){\tabNTSC}
\end{pspicture}
```

	Red	Green	Blue	White
x	0.7355	0.2658	0.1669	0.3333
y	0.2645	0.7243	0.0085	0.3333

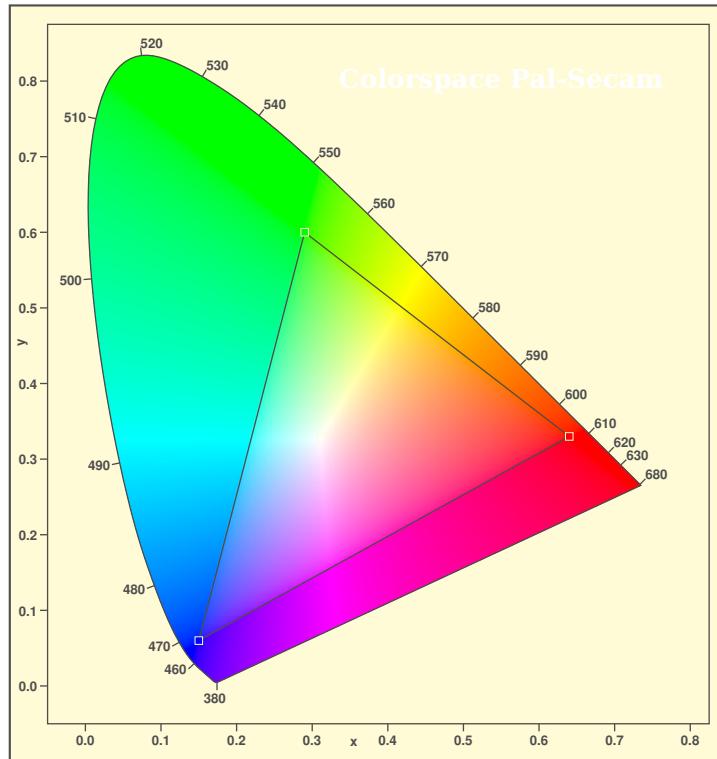


```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[ColorSpace=CIE]
\rput(5.5,8){\white \textbf{Colorspace CIE}}
\rput(4,10){\tabCIE}
\end{pspicture}
```

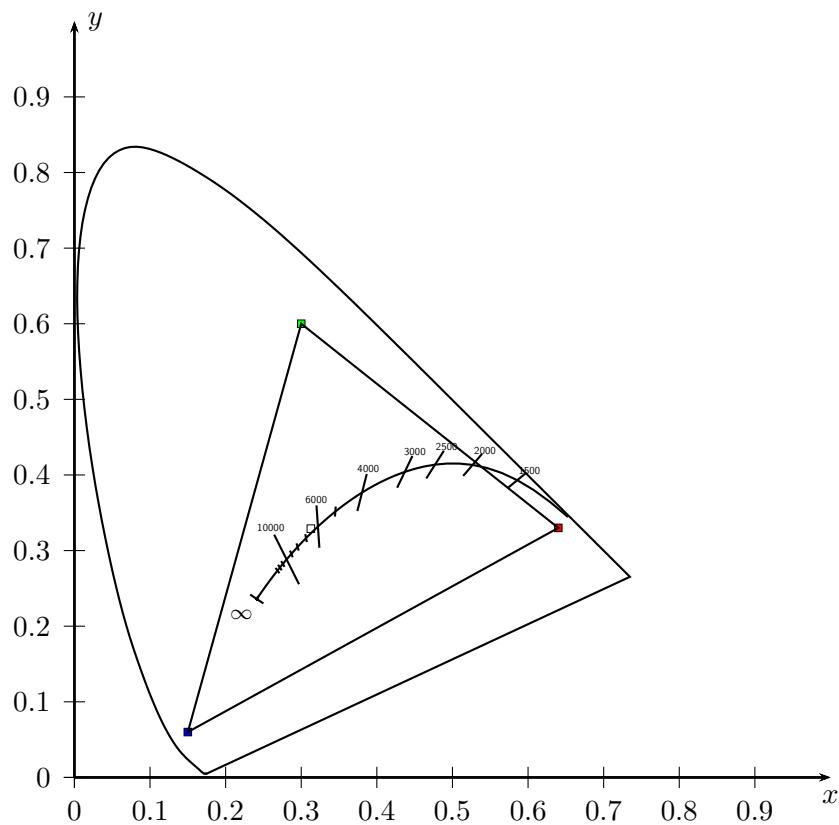
	Red	Green	Blue	White
x	0.6400	0.2900	0.1500	0.3127
y	0.3300	0.6000	0.0600	0.3290



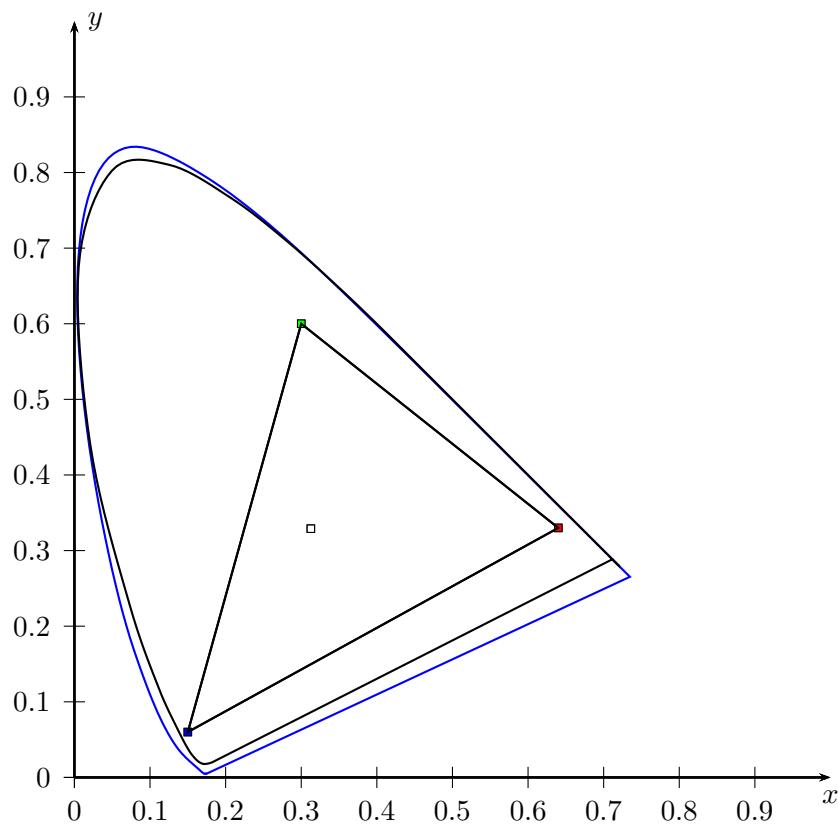
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[ColorSpace=Pal-Secam]
\rput(5.5,8){\white \textbf{Colorspace Pal-Secam}}
\rput(4,10){\tabPal-Secam}
\end{pspicture}
```



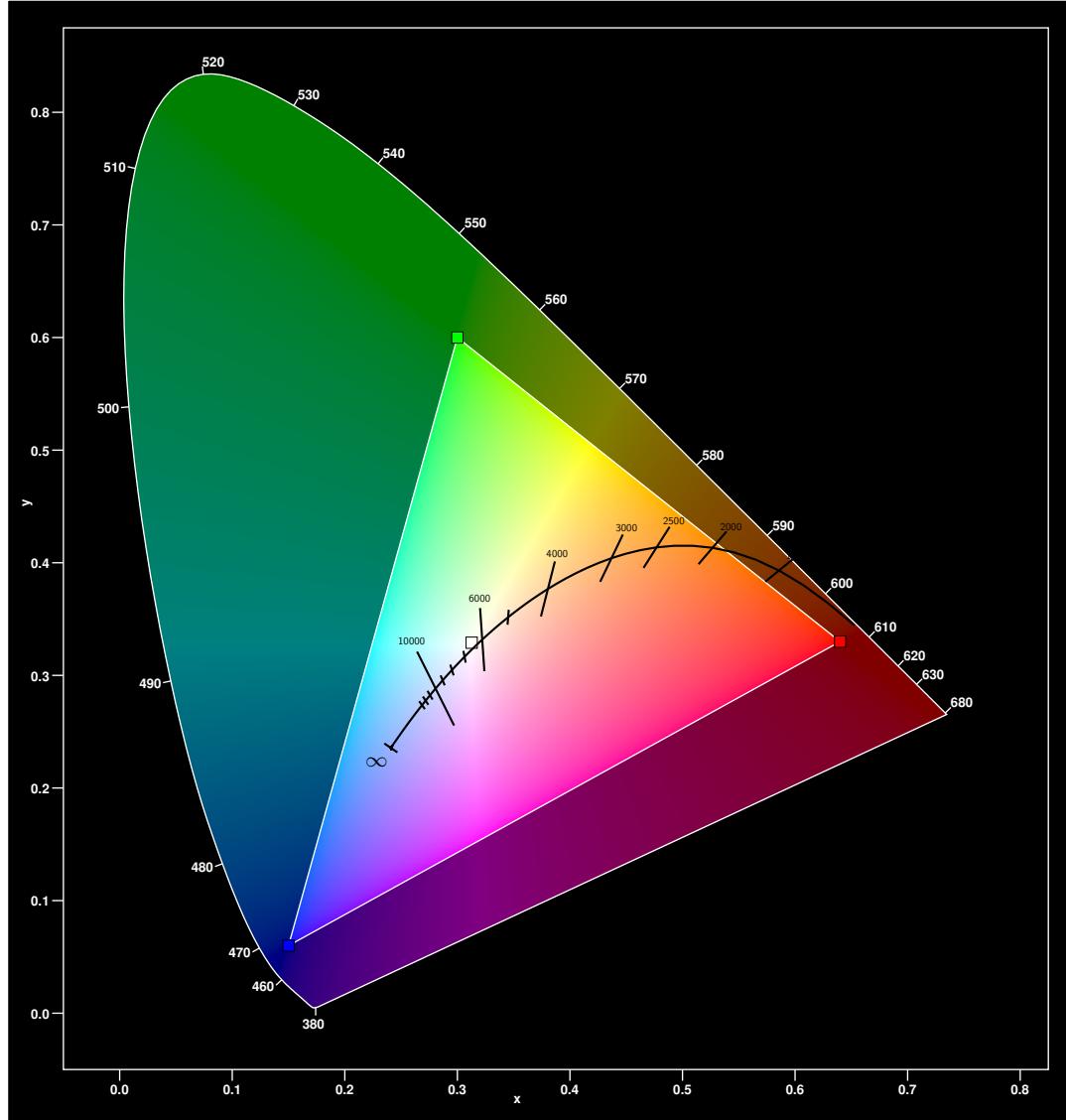
```
\begin{pspicture}(-1,-1)(8.5,11)
\psChromaticityDiagram[bgcolor=yellow!100!black!20,
                      textcolor=black!70,ColorSpace=Pal-Secam]
\rput(5.5,8){\white\textbf{Colorspace Pal-Secam}}
\end{pspicture}
```



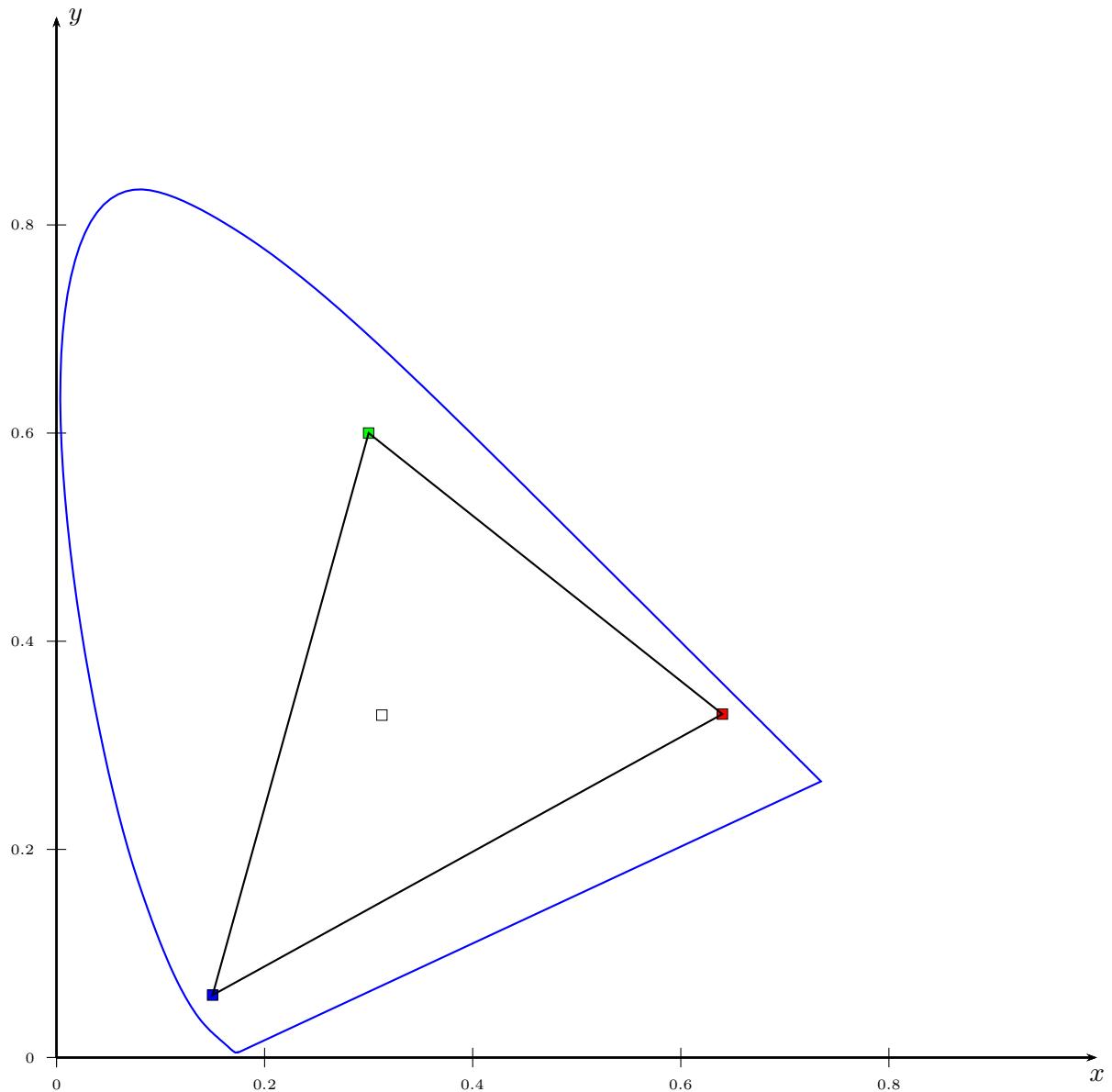
```
\begin{pspicture}(-1,-1)(10,10)
\psaxes[Dx=0.1,dx=1,Dy=0.1,dy=1]{->}(0,0)(10,10)[x,-90][y,0]
\pstPlanck[showcontour]
\end{pspicture}
```



```
\makeatletter
\begin{pspicture}(-1,-1)(10,10)
\psaxes[Dx=0.1,dx=1,Dy=0.1,dy=1]{->}(0,0)(10,10)[x,-90][y,0]
\pstCIEcontour[linecolor=blue]%
\pstCIEcontour[datas=CIE1964,linestyle=dashed]%
\end{pspicture}
\makeatother
```



```
\begin{pspicture}(-1,-1)(15,15)
\psChromaticityDiagram[unit=1.5,contrast=0.5]%
\pstPlanck[unit=1.5]
\end{pspicture}
```



```
\begin{pspicture}(-1,-1)(15,15)
\psaxes[Dx=0.2,dx=3,Dy=0.2,dy=3,
labelFontSize=\scriptscriptstyle{->}(0,0)(15,15)[x$,-90][y$,0]
\pstCIEcontour[unit=1.5,linecolor=blue]%
\end{pspicture}
```

### 3 List of all optional arguments for `pst-cie`

Key	Type	Default
gamma	ordinary	2.2
contrast	ordinary	1
chromaticityCoordinates	ordinary	xy
bgcolor	ordinary	black
textcolor	ordinary	white
trianglecolor	ordinary	black
primaries	boolean	true
Tfontsize	ordinary	[none]
Planck	boolean	true
showcontour	boolean	true
ColorSpace	ordinary	[none]
datas	ordinary	[none]

### References

- [1] Michel Goosens et al. *The L<sup>A</sup>T<sub>E</sub>X Graphics Companion*. 2nd ed. Reading, Mass.: Addison-Wesley Publishing Company, 2007.
- [2] Laura E. Jackson and Herbert Voß. “Die Plot-Funktionen von `pst-plot`”. In: *Die T<sub>E</sub>Xnische Komödie* 2/02 (June 2002), pp. 27–34.
- [3] Nikolai G. Kollock. *PostScript richtig eingesetzt: vom Konzept zum praktischen Einsatz*. Vaterstetten: IWT, 1989.
- [4] Manuel Luque. *PSTricks application*. 2016. URL: <http://pstricks.blogspot.de>.
- [5] Robert Sèvre. *Physique de la couleur – De l'apparence colorée à la technique colorimétrique*. Paris: Masson, 1996.
- [6] Herbert Voß. “Die mathematischen Funktionen von Postscript”. In: *Die T<sub>E</sub>Xnische Komödie* 1/02 (Mar. 2002), pp. 40–47.
- [7] Herbert Voß. *PSTricks – Graphics for T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X*. 1st ed. Cambridge: UIT, 2011.
- [8] Herbert Voß. *L<sup>A</sup>T<sub>E</sub>X quick reference*. Cambridge: UIT, 2011.

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