

THE COCHINEAL FONT PACKAGE

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Cochineal is a fork of Crimson, a remarkable creation of Sebastian Kosch inspired by oldstyle font designers. The name Cochineal is intended to suggest that, while it is crimson, there may be bugs involved. More than 1500 glyphs were added to Crimson, allowing a more than modest chance that some poor spacing or kerning or accent placement might have been introduced. Such problems will occur in the less frequented parts of the fonts, and I would appreciate reports of problems you may discover. You are unlikely to trip over issues if you stay within the bounds of, say, the T1 encoding. I did correct problems in a number of glyphs from Crimson that FontForge uncovered and that could have led to poor rendition on some platforms, especially MAC OS. I also changed the emsize to 1000 (the standard for PostScript-flavored Opentype) from the Crimson value of 1024 and rescaled accordingly.

Cochineal provides Roman, Bold, *Italic* and **BoldItalic**. (Crimson provided semibold weights but with only limited coverage, which I did not wish to extend as this would have required the creation of about 2000 additional glyphs. Bob Tennent's Crimson package does support semibold and the other styles, though without my glyph additions.)

PACKAGE FEATURES:

In addition to the encodings OT1, T1, TS1, LY1 in general use by Western European (and some Eastern European) scripts, the package also offers LGR with full support for monotonic, polytonic and some ancient Greek, and T2A and OT2 Cyrillic support. All allow a choice from four figure styles—TLF (tabular lining figures, monospaced and uppercase), LF (proportional lining figures, uppercase), TOSF (tabular oldstyle figures, monospaced and lowercase) and OSF (proportional oldstyle figures, lowercase). The encodings OT1, T1, TS1, LY1 offer SMALL CAPS, even *ITALICS SMALL CAPS*, and additional figure styles—superiors, inferiors and denominators. These features are available from either fontspec or from [pdf]L^AT_EX. In L^AT_EX, you access these through the macros `\textsu`, `\textin` and `\textde`, or through their font-switching equivalents `\sufigures`, `\infigures` and `\defigures`. For example:

- `M\textsu{lle}` Dupont and `M{\sufigures lle}` Dupont both produce M^{lle} Dupont.
- `{\infigures 12345}` and `\textin{12345}` render as ₁₂₃₄₅, dipping noticeably below the baseline, while `{\defigures 12345}` and `\textde{12345}` render as ₁₂₃₄₅, aligned with the baseline.

PACKAGE OPTIONS AND MACROS:

The package defines two macros, `\useosf` and `\useproportional`, useable only in the preamble, which determine the default figure style in text. A typical invocation would be something like

```
\usepackage{cochineal} % default figure style is tabular, lining
% load sans and typewriter fonts
% load a math font---it will use tabular lining figures in math
\useosf % switch from lining figures to oldstyle figures
\useproportional % switch from tabular to proportional
```

There is a simpler way to achieve essentially the same result, but with the advantage that the figure styles are not loaded until after the math package (if any) is loaded, so that math always uses the default tabular lining figures.

```
% If you use babel, load it here, before cochineal
\usepackage[p,osf]{cochineal} % default figure style is proportional, oldstyle
% load sans and typewriter fonts
% load a math font---it will use tabular lining figures in math
```

No matter what the default figure style in text, the package provides switches and macros to use any available figure style.

- `\textlf{}` and `\lfstyle` give proportional lining figures; `\texttlf{}` and `\tlfstyle` give tabular lining figures; `\textosf{}` and `\osfstyle` give proportional oldstyle figures; `\texttosf{}` and `\tosfstyle` give tabular oldstyle figures; `\textfrac{3}{4}` uses superior and denominator figures to make the fraction $\frac{3}{4}$.

The options that can be passed to `cochineal.sty` are the following:

- `scale` or `scaled`: a magnification factor—e.g., `scaled=1.02` enlarges all text controlled by the package by 2%;
- `p`, or `proportional`: make proportional figures the default rather than tabular; `lf`, or `lining`: make lining figures the default (this is already the default); `osf`, or `oldstyle`: make oldstyle figures the default rather than lining;
- `sup`s: use superior figures to make footnote markers, rather than the \LaTeX 's default markers;
- `swashQ`: use Cochineal's swash instead of its tamer default version, ;
- `scosf`: always use oldstyle figures within a small caps block;
- `theoremfont`: for theorem statements in the plain style, use a doctored version of italics that has upright figures, braces, brackets, parentheses, exclamation mark, colon and semicolon.

MATHEMATICAL ACCOMPANIMENT

The package contains fonts for use as math letters that are derived from Cochineal Roman and Greek glyphs and the `newtxmath` family. Note that ν and ν (Greek nu) are quite distinct. Here's a sample.

```
% preamble should include, in this order:
\usepackage[T1]{fontenc}
% load babel here
\usepackage[p,osf]{cochineal}
\usepackage[varqu,varl,var0]{inconsolata}
\usepackage[scale=.95,type1]{cabin}
\usepackage[cochineal,vvarbb]{newtxmath}
\usepackage[cal=boondoxo]{mathalfa}
```

The typeset math below follows the ISO recommendations that only variables be set in italic. Note the use of upright shapes for d , e and π . (The first two are entered as `\mathrm{d}` and `\mathrm{e}`, and in fonts derived from `mtpro2` or `newtxmath`, the latter is entered as `\uppi`.)

Simplest form of the *Central Limit Theorem*: Let X_1, X_2, \dots be a sequence of iid random variables with mean 0 and variance 1 on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$. Then

$$\mathbb{P}\left(\frac{X_1 + \dots + X_n}{\sqrt{n}} \leq v\right) \rightarrow \mathfrak{N}(v) := \int_{-\infty}^v \frac{e^{-t^2/2}}{\sqrt{2\pi}} dt \quad \text{as } n \rightarrow \infty,$$

or, equivalently, letting $S_n := \sum_1^n X_k$,

$$\mathbb{E}f\left(S_n/\sqrt{n}\right) \rightarrow \int_{-\infty}^{\infty} f(t) \frac{e^{-t^2/2}}{\sqrt{2\pi}} dt \quad \text{as } n \rightarrow \infty, \text{ for every } f \in \mathcal{BC}(\mathbb{R}).$$

TYPESETTING GREEK WITH L^AT_EX

Cochineal offers a rather complete LGR-encoded glyph collection, lacking just a few ancient symbols.

	ó	í	ú	û	ü	ý	ö	ÿ	
00x	— 0	ˆ 1	2	3	4	5	ς 6	ς 7	0x
01x	ˆ 8	À 9	Ĥ 10	Œ 11	À 12	ÿ 13	α 14	ü 15	
02x	ˆ 16	ˆ 17	Ĥ 18	Œ 19	ˆ 20	Œ 21	ς 22	ˆ 23	1x
03x	€ 24	‰ 25	ə 26	ˆ 27	ˆ 28	ˆ 29	ˆ 30	ˆ 31	
04x	ˆ 32	! 33	ˆ 34	ˆ 35	ˆ 36	‰ 37	ˆ 38	ˆ 39	2x
05x	(40	) 41	* 42	+ 43	, 44	- 45	. 46	/ 47	
06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	3x
07x	8 56	9 57	: 58	· 59	ˆ 60	= 61	ˆ 62	; 63	
10x	ˆ 64	À 65	B 66	ˆ 67	Δ 68	E 69	Φ 70	Γ 71	4x
11x	H 72	I 73	Θ 74	K 75	Λ 76	M 77	N 78	O 79	
12x	Π 80	X 81	P 82	Σ 83	T 84	Υ 85	ˆ 86	Ω 87	5x
13x	Ξ 88	Ψ 89	Z 90	[91	ˆ 92	] 93	ˆ 94	ˆ 95	
14x	ˆ 96	α 97	β 98	ς 99	δ 100	ε 101	φ 102	γ 103	6x
15x	η 104	ι 105	θ 106	κ 107	λ 108	μ 109	ν 110	ο 111	
16x	π 112	χ 113	ρ 114	σ 115	τ 116	υ 117	118	ω 119	7x
17x	ξ 120	ψ 121	ζ 122	« 123	ˆ 124	» 125	ˆ 126	— 127	
20x	à 128	á 129	â 130	ã 131	ä 132	å 133	æ 134	ç 135	8x
21x	á 136	ä 137	å 138	æ 139	ç 140	ä 141	å 142	æ 143	
22x	ã 144	ä 145	å 146	F 147	ç 148	ä 149	å 150	ˆ 151	9x
23x	ı 152	ı 153	ı 154	155	ı 156	ı 157	ı 158	159	
24x	ı 160	ı 161	ı 162	ı 163	ı 164	ı 165	ı 166	ı 167	Ax
25x	ı 168	ı 169	ı 170	ı 171	ı 172	ı 173	ı 174	ı 175	
26x	ò 176	ó 177	ô 178	õ 179	ö 180	ù 181	û 182	ü 183	Bx
27x	ó 184	ô 185	õ 186	ö 187	ù 188	û 189	ü 190	ü 191	
30x	ö 192	ü 193	ü 194	F 195	ü 196	ü 197	ü 198	199	Cx
31x	ì 200	í 201	î 202	ï 203	ù 204	ú 205	û 206	ü 207	
32x	í 208	î 209	ï 210	ì 211	ú 212	û 213	ü 214	ü 215	Dx
33x	ï 216	ï 217	ï 218	ï 219	ü 220	ü 221	ü 222	ÿ 223	
34x	è 224	é 225	ê 226	ë 227	ò 228	ó 229	ô 230	õ 231	Ex
35x	é 232	ë 233	ë 234	ë 235	ó 236	ô 237	õ 238	õ 239	
36x	ï 240	ï 241	ï 242	ï 243	ü 244	ü 245	ü 246	ü 247	Fx
37x	α 248	η 249	ω 250	ρ 251	ˆ 252	253	ˆ 254	ˆ 255	
	ˆ 8	ˆ 9	ˆ A	ˆ B	ˆ C	ˆ D	ˆ E	ˆ F	

Setting up your source file to use LGR usually involves `babel` and `substitutefont`. See the documentation of `nimbus15` for details.

TYPESETTING RUSSIAN

With T2A encoding, the process is the same as with other T2A-encoded fonts, though the gaps in coverage may affect users of a number of non-Russian Cyrillic scripts. The only figure style provided is tabular lining (TLF.)

	ó	í	2	3	4	5	ó	7	
00x	°	1	2	3	4	5	6	7	0x
01x	8	9	10	11	12	13	14	15	
02x	“	”	^	19	20	21	22	23	1x
03x	24	1 25	j 26	ff 27	fi 28	fl 29	ffl 30	ffl 31	
04x	32	! 33	" 34	# 35	\$ 36	% 37	& 38	' 39	2x
05x	(40	) 41	* 42	+ 43	, 44	- 45	. 46	/ 47	
06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	3x
07x	8 56	9 57	: 58	; 59	< 60	= 61	> 62	? 63	
10x	@ 64	A 65	B 66	C 67	D 68	E 69	F 70	G 71	4x
11x	H 72	I 73	J 74	K 75	L 76	M 77	N 78	O 79	
12x	P 80	Q 81	R 82	S 83	T 84	U 85	V 86	W 87	5x
13x	X 88	Y 89	Z 90	[91	\ 92	] 93	^ 94	_ 95	
14x	' 96	a 97	b 98	c 99	d 100	e 101	f 102	g 103	6x
15x	h 104	i 105	j 106	k 107	l 108	m 109	n 110	o 111	
16x	p 112	q 113	r 114	s 115	t 116	u 117	v 118	w 119	7x
17x	x 120	y 121	z 122	{ 123	| 124	} 125	~ 126	- 127	
20x	128	129	130	131	132	133	134	135	8x
21x	136	137	138	139	140	141	142	143	
22x	144	145	146	147	148	149	150	151	9x
23x	152	153	154	155	156	157	158	159	
24x	160	161	162	163	164	165	166	167	Ax
25x	168	169	170	171	172	173	174	175	
26x	176	177	178	179	180	181	182	183	Bx
27x	184	185	186	187	188	189	190	191	
30x	192	193	194	195	196	197	198	199	Cx
31x	200	201	202	203	204	205	206	207	
32x	208	209	210	211	212	213	214	215	Dx
33x	216	217	218	219	220	221	222	223	
34x	224	225	226	227	228	229	230	231	Ex
35x	232	233	234	235	236	237	238	239	
36x	240	241	242	243	244	245	246	247	Fx
37x	248	249	250	251	252	253	254	255	
	8	9	A	B	C	D	E	F	

The OT2 encoding (supposedly obsolete, but still useful) is intended for limited use in producing Russian characters with a Western keyboard, making by means of \TeX a transliteration of ASCII for most characters in the range 33–122, and providing ligatures to generate the rest. See the documentation of nimbus15 for further details.

	ó	í	ú	û	ü	ý	ö	ÿ	
00x	Ъ 0	Ь 1	Ц 2	Э 3	І 4	Є 5	Ђ 6	Ћ 7	"0x
01x	Ѓ 8	Ќ 9	Ц 10	Э 11	І 12	Є 13	Ђ 14	Ћ 15	
02x	Ю 16	Ж 17	Й 18	Ё 19	Ѹ 20	Ѳ 21	Ѣ 22	Я 23	"1x
03x	Ю 24	Ж 25	Й 26	Ё 27	Ѹ 28	Ѳ 29	Ѣ 30	Я 31	
04x	“ 32	! 33	” 34	Ђ 35	˘ 36	% 37	’ 38	’ 39	"2x
05x	(40	) 41	* 42	Ѓ 43	, 44	- 45	. 46	/ 47	
06x	0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	"3x
07x	8 56	9 57	: 58	; 59	« 60	І 61	» 62	? 63	
10x	˘ 64	А 65	Б 66	Ц 67	Д 68	Е 69	Ф 70	Г 71	"4x
11x	Х 72	И 73	Ј 74	К 75	Л 76	М 77	Н 78	О 79	
12x	П 80	Ч 81	Р 82	С 83	Т 84	У 85	В 86	Щ 87	"5x
13x	Ш 88	Ы 89	З 90	[91	“ 92	] 93	Ь 94	Ђ 95	
14x	‘ 96	а 97	б 98	ц 99	д 100	е 101	ф 102	г 103	"6x
15x	Х 104	и 105	ј 106	к 107	л 108	м 109	н 110	о 111	
16x	п 112	ч 113	р 114	с 115	т 116	у 117	в 118	щ 119	"7x
17x	ш 120	ы 121	з 122	— 123	— 124	№ 125	Ъ 126	Ћ 127	
	“8	“9	“A	“B	“C	“D	“E	“F	