Greek characters supported by *greek-fontenc*

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Abstract

This document lists all Greek characters that are supported by *greek-fontenc* and tests the outcome of `\MakeUppercase` and `\MakeLowercase` for different input variants (literal input, LICR[1] macro, Latin transliteration).

The document is compiled with pdfTeX, format version 2023-11-01 patch-level 0, and the L3 programming layer from 2023-11-09.

The *babel-greek* version is "2023/10/13 1.15 Greek support for the babel system".

The `\greekfontencoding` is LGR and the current language variant is *polutoniko*.

Contents

1 Input Variants

The columns represent the following input variants:

1. literal character

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[1]LaTeX internal character representation

2. named accent macro + LICR

3. short accent macro + LICR

4. short accent macro + transliteration

5. accent character + transliteration

For composite diacritics, there are additional columns for short macros in reversed order and with the second diacritic as accent macro.

2 Greek and Coptic

Characters from the Greek and Coptic Unicode block that are supported by *greek-fontenc* and *greek-inputenc*:

No.	original case	MakeUppercase	MakeLowercase
x0374	΄ ΄	΄ ΄	΄ ΄
x0375	͵ ͵	͵ ͵	͵ ͵
x037A	ͺ ͺͺ	ͺ ͺͺ	ͺ ͺͺ
x037E	; ; ;	; ; ;	; ; ;
x0384	΄ ΄ ΄ ΄	΄	΄ ΄ ΄ ΄
x0385	΅ ΅ ΅ ΅ ΅ ΅	΅ ΅ ΅ ΅ ΅ ΅ ,	΅ ΅ ΅ ΅ ΅ ΅
x0386	Ά Ά Ά Ά Ά	A A A A A	ά ά ά ά ά
x0387	· · ·	· · ·	· · ·
x0388	Έ Έ Έ Έ Έ	E E E E E	έ έ έ έ έ
x0389	Ή Ή Ή Ή Ή	Ή H H H H	ή ή ή ή ή
x038A	Ί Ί Ί Ί Ί	I I I I I	ί ί ί ί ί
x038C	Ό Ό Ό Ό Ό	O O O O O	ό ό ό ό ό
x038E	Ύ Ύ Ύ Ύ Ύ	Υ Υ Υ Υ Υ	ύ ύ ύ ύ ύ
x038F	Ώ Ώ Ώ Ώ Ώ	Ω Ω Ω Ω Ω	ώ ώ ώ ώ ώ
x0390	ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ	Ϊ Ϊ Ϊ Ϊ Ϊ Ϊ Ϊ Ϊ	ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ [2]
x0391	Α Α Α	A A A	α α α
x0392	Β Β Β	B B B	β β β
x0393	Γ Γ Γ	Γ Γ Γ	γ γ γ
x0394	Δ Δ Δ	Δ Δ Δ	δ δ δ
x0395	E E E	E E E	ε ε ε
x0396	Z Z Z	Z Z Z	ζ ζ ζ
x0397	H H H	H H H	η η η
x0398	Θ Θ Θ Θ	Θ Θ Θ Θ	ϑ ϑ ϑ ϑ
x0399	I I I	I I I	ι ι ι
x039A	K K K	K K K	ϰ ϰ ϰ
x039B	Λ Λ Λ	Λ Λ Λ	λ λ λ
x039C	M M M	M M M	μ μ μ
x039D	N N N	N N N	ν ν ν
x039E	Ξ Ξ Ξ	Ξ Ξ Ξ	ξ ξ ξ
x039F	O O O	O O O	o o o
x03A0	Π Π Π	Π Π Π	π π π
x03A1	P P P	P P P	ϱ ϱ ϱ
x03A3	Σ Σ Σ	Σ Σ Σ	ς ς ς cf. section 4.2.2

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[2]With the pre-2022 `\MakeUppercase` and literal input, the order of combined accents involving the dialytika is important, e.g., `"'i` results in ΐ → Ϊ.

x03A4	Τ Τ Τ		T T T		τ τ τ
x03A5	Υ Υ Υ		Y Y Y		υ υ υ
x03A6	Φ Φ Φ		Φ Φ Φ		φ φ φ
x03A7	X X X		X X X		χ χ χ
x03A8	Ψ Ψ Ψ		Ψ Ψ Ψ		ψ ψ ψ
x03A9	Ω Ω Ω		Ω Ω Ω		ω ω ω
x03AA	Ϊ Ϊ Ϊ Ϊ		Ϊ Ϊ Ϊ Ϊ		ϊ ϊ ϊ ϊ
x03AB	Ϋ Ϋ Ϋ Ϋ Ϋ		Ϋ Ϋ Ϋ Ϋ Ϋ		ϋ ϋ ϋ ϋ ϋ
x03AC	ά ά ά ά ά		A A A A A		ά ά ά ά ά
x03AD	έ έ έ έ έ		E E E E E		έ έ έ έ έ
x03AE	ή ή ή ή ή		Ή H H H H		ή ή ή ή ή
x03AF	ί ί ί ί ί		I I I I I		ί ί ί ί ί
x03B0	ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ		Ϋ Ϋ Ϋ Ϋ Ϋ Ϋ Ϋ Ϋ Ϋ		ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ
x03B1	α α α		A A A		α α α
x03B2	β β β		B B B		β β β
x03B3	γ γ γ		Γ Γ Γ		γ γ γ
x03B4	δ δ δ		Δ Δ Δ		δ δ δ
x03B5	ε ε ε ε		E E E E		ε ε ε ε
x03B6	ζ ζ ζ		Z Z Z		ζ ζ ζ
x03B7	η η η		H H H		η η η
x03B8	ϑ ϑ ϑ		Θ Θ Θ		ϑ ϑ ϑ
x03B9	ι ι ι		I I I		ι ι ι
x03BA	κ κ κ		K K K		κ κ κ
x03BB	λ λ λ		Λ Λ Λ		λ λ λ
x03BC	μ μ μ		M M M		μ μ μ
x03BD	ν ν ν		N N N		ν ν ν
x03BE	ξ ξ ξ		Ξ Ξ Ξ		ξ ξ ξ
x03BF	o o o		O O O		o o o
x03C0	π π π		Π Π Π		π π π
x03C1	ρ ρ ρ		P P P		ρ ρ ρ
x03C2	ς ς ς ς		Σ Σ Σ Σ		ς ς ς ς
x03C3	σ σ σ σ σ		Σ Σ Σ Σ Σ̆		σ σ σ σ σ sic![3]
x03C4	τ τ τ		T T T		τ τ τ
x03C5	υ υ υ		Υ Υ Υ		υ υ υ
x03C6	φ φ φ φ		Φ Φ Φ Φ		φ φ φ φ
x03C7	χ χ χ		X X X		χ χ χ
x03C8	ψ ψ ψ		Ψ Ψ Ψ		ψ ψ ψ
x03C9	ω ω ω		Ω Ω Ω		ω ω ω
x03CA	ϊ ϊ ϊ ϊ ϊ		Ϊ Ϊ Ϊ Ϊ Ϊ		ϊ ϊ ϊ ϊ ϊ
x03CB	ϋ ϋ ϋ ϋ ϋ		Ϋ Ϋ Ϋ Ϋ Ϋ		ϋ ϋ ϋ ϋ ϋ
x03CC	ό ό ό ό ό		O O O O O		ό ό ό ό ό
x03CD	ύ ύ ύ ύ ύ		Υ Υ Υ Υ Υ		ύ ύ ύ ύ ύ
x03CE	ώ ώ ώ ώ ώ		Ω Ω Ω Ω Ω		ώ ώ ώ ώ ώ
x03D0	β β β		B B B		β β β
x03D1	ϑ ϑ ϑ		Θ Θ Θ		ϑ ϑ ϑ
x03D5	φ φ		Φ Φ		φ φ
x03D6	π π π		Π Π Π		π π π
x03D8	Ϙ Ϙ		Ϙ Ϙ		Ϙ Ϙ
x03D9	ϙ ϙ		Ϙ Ϙ		ϙ ϙ

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[3]transliteration sv fails in uppercase

x03DA	Ϛ Ϛ	Ϛ Ϛ		ϛ ϛ
x03DB	ϛ ϛ	Ϛ Ϛ		ϛ ϛ
x03DC	Ϝ Ϝ	Ϝ Ϝ		Ϝ Ϝ
x03DD	ϝ ϝ	Ϝ Ϝ		ϝ ϝ
x03DE	Ϟ Ϟ	ϟ ϟ		ϟ ϟ
x03DF	ϟ ϟ	ϟ ϟ		ϟ ϟ
x03E0	Ϡ Ϡ	Ϡ Ϡ		ϡ ϡ
x03E1	ϡ ϡ	Ϡ Ϡ		ϡ ϡ
x03F0	ϰ ϰ ϰ	Κ Κ Κ		ϰ ϰ ϰ
x03F1	ϱ ϱ ϱ	Ρ Ρ Ρ		ϱ ϱ ϱ
x03F4	ϴ ϴ	Θ Θ		ϑ ϑ
x03F5	ϵ ϵ	Ε Ε		ϵ ϵ

3 Greek extended

x1F00	ἀ ἀ ἀ ἀ ἀ	Α Α Α Α Α	ἀ ἀ ἀ ἀ ἀ
x1F01	ἁ ἁ ἁ ἁ ἁ	Α Α Α Α Α	ἁ ἁ ἁ ἁ ἁ
x1F02	ἂ ἂ ἂ ἂ ἂ ἂ ἂ ἂ	Α Α Α Α Α Α Α Α	ἂ ἂ ἂ ἂ ἂ ἂ ἂ ἂ
x1F03	ἃ ἃ ἃ ἃ ἃ ἃ ἃ ἃ	Α Α Α Α Α Α Α Α	ἃ ἃ ἃ ἃ ἃ ἃ ἃ ἃ
x1F04	ἄ ἄ ἄ ἄ ἄ ἄ ἄ ἄ	Α Α Α Α Α Α Α Α	ἄ ἄ ἄ ἄ ἄ ἄ ἄ ἄ
x1F05	ἅ ἅ ἅ ἅ ἅ ἅ ἅ ἅ	Α Α Α Α Α Α Α Α	ἅ ἅ ἅ ἅ ἅ ἅ ἅ ἅ
x1F06	ἆ ἆ ἆ ἆ ἆ ἆ ἆ ἆ	Α Α Α Α Α Α Α Α	ἆ ἆ ἆ ἆ ἆ ἆ ἆ ἆ
x1F07	ἇ ἇ ἇ ἇ ἇ ἇ ἇ ἇ	Α Α Α Α Α Α Α Α	ἇ ἇ ἇ ἇ ἇ ἇ ἇ ἇ
x1F08	Ἀ Ἀ Ἀ Ἀ Ἀ	Α Α Α Α Α	ἀ ἀ ἀ ἀ ἀ
x1F09	Ἁ Ἁ Ἁ Ἁ Ἁ	Α Α Α Α Α	ἁ ἁ ἁ ἁ ἁ
x1F0A	Ἂ Ἂ Ἂ Ἂ Ἂ Ἂ Ἂ Ἂ Ἂ	Α Α Α Α Α Α Α Α	ἂ ἂ ἂ ἂ ἂ ἂ ἂ ἂ
x1F0B	Ἃ Ἃ Ἃ Ἃ Ἃ Ἃ Ἃ Ἃ	Α Α Α Α Α Α Α Α	ἃ ἃ ἃ ἃ ἃ ἃ ἃ ἃ
x1F0C	Ἄ Ἄ Ἄ Ἄ Ἄ Ἄ Ἄ Ἄ	Α Α Α Α Α Α Α Α	ἄ ἄ ἄ ἄ ἄ ἄ ἄ ἄ
x1F0D	Ἅ Ἅ Ἅ Ἅ Ἅ Ἅ Ἅ Ἅ	Α Α Α Α Α Α Α Α	ἅ ἅ ἅ ἅ ἅ ἅ ἅ ἅ
x1F0E	Ἆ Ἆ Ἆ Ἆ Ἆ Ἆ Ἆ Ἆ Ἆ	Α Α Α Α Α Α Α Α	ἆ ἆ ἆ ἆ ἆ ἆ ἆ ἆ
x1F0F	Ἇ Ἇ Ἇ Ἇ Ἇ Ἇ Ἇ Ἇ Ἇ	Α Α Α Α Α Α Α Α	ἇ ἇ ἇ ἇ ἇ ἇ ἇ ἇ
x1F10	ἐ ἐ ἐ ἐ	Ε Ε Ε Ε	ἐ ἐ ἐ ἐ
x1F11	ἑ ἑ ἑ ἑ	Ε Ε Ε Ε	ἑ ἑ ἑ ἑ
x1F12	ἒ ἒ ἒ ἒ	Ε Ε Ε Ε	ἒ ἒ ἒ ἒ
x1F13	ἓ ἓ ἓ ἓ	Ε Ε Ε Ε	ἓ ἓ ἓ ἓ
x1F14	ἔ ἔ ἔ ἔ	Ε Ε Ε Ε	ἔ ἔ ἔ ἔ
x1F15	ἕ ἕ ἕ ἕ	Ε Ε Ε Ε	ἕ ἕ ἕ ἕ
x1F18	Ἐ Ἐ Ἐ Ἐ Ἐ	Ε Ε Ε Ε	ἐ ἐ ἐ ἐ
x1F19	Ἑ Ἑ Ἑ Ἑ Ἑ	Ε Ε Ε Ε	ἑ ἑ ἑ ἑ
x1F1A	Ἒ Ἒ Ἒ Ἒ Ἒ	Ε Ε Ε Ε	ἒ ἒ ἒ ἒ
x1F1B	Ἓ Ἓ Ἓ Ἓ Ἓ	Ε Ε Ε Ε	ἓ ἓ ἓ ἓ
x1F1C	Ἔ Ἔ Ἔ Ἔ Ἔ	Ε Ε Ε Ε	ἔ ἔ ἔ ἔ
x1F1D	Ἕ Ἕ Ἕ Ἕ Ἕ	Ε Ε Ε Ε	ἕ ἕ ἕ ἕ
x1F20	ἠ ἠ ἠ ἠ ἠ	Η Η Η Η	ἠ ἠ ἠ ἠ ἠ
x1F21	ἡ ἡ ἡ ἡ ἡ	Η Η Η Η	ἡ ἡ ἡ ἡ ἡ
x1F22	ἢ ἢ ἢ ἢ ἢ	Ἢ Η Η Η	ἢ ἢ ἢ ἢ ἢ
x1F23	ἣ ἣ ἣ ἣ ἣ	Η Η Η Η	ἣ ἣ ἣ ἣ ἣ
x1F24	ἤ ἤ ἤ ἤ ἤ	Η Η Η Η	ἤ ἤ ἤ ἤ ἤ

x1F25	ἤ ἤ ἤ ἤ ἤ	Η Η Η Η	ἤ ἤ ἤ ἤ ἤ
x1F26	ἦ ἦ ἦ ἦ ἦ	Η Η Η Η	ἦ ἦ ἦ ἦ ἦ
x1F27	ἧ ἧ ἧ ἧ ἧ	Η Η Η Η	ἧ ἧ ἧ ἧ ἧ
x1F28	Ἠ Ἠ Ἠ Ἠ Ἠ	Η Η Η Η	ἠ ἠ ἠ ἠ ἠ
x1F29	Ἡ Ἡ Ἡ Ἡ Ἡ	Η Η Η Η	ἡ ἡ ἡ ἡ ἡ
x1F2A	Ἢ Ἢ Ἢ Ἢ Ἢ	Ἡ Η Η Η	ἢ ἢ ἢ ἢ ἢ
x1F2B	Ἣ Ἣ Ἣ Ἣ Ἣ	Η Η Η Η	ἣ ἣ ἣ ἣ ἣ
x1F2C	Ἤ Ἤ Ἤ Ἤ Ἤ	Η Η Η Η	ἤ ἤ ἤ ἤ ἤ
x1F2D	Ἥ Ἥ Ἥ Ἥ Ἥ	Η Η Η Η	ἥ ἥ ἥ ἥ ἥ
x1F2E	Ἦ Ἦ Ἦ Ἦ Ἦ	Η Η Η Η	ἦ ἦ ἦ ἦ ἦ
x1F2F	Ἧ Ἧ Ἧ Ἧ Ἧ	Η Η Η Η	ἧ ἧ ἧ ἧ ἧ
x1F30	ἰ ἰ ἰ ἰ ἰ	Ι Ι Ι Ι Ι	ἰ ἰ ἰ ἰ ἰ
x1F31	ἱ ἱ ἱ ἱ ἱ	Ι Ι Ι Ι Ι	ἱ ἱ ἱ ἱ ἱ
x1F32	ἲ ἲ ἲ ἲ ἲ	Ι Ι Ι Ι Ι	ἲ ἲ ἲ ἲ ἲ
x1F33	ἳ ἳ ἳ ἳ ἳ	Ι Ι Ι Ι Ι	ἳ ἳ ἳ ἳ ἳ
x1F34	ἴ ἴ ἴ ἴ ἴ	Ι Ι Ι Ι Ι	ἴ ἴ ἴ ἴ ἴ
x1F35	ἵ ἵ ἵ ἵ ἵ	Ι Ι Ι Ι Ι	ἵ ἵ ἵ ἵ ἵ
x1F36	ἶ ἶ ἶ ἶ ἶ	Ι Ι Ι Ι Ι	ἶ ἶ ἶ ἶ ἶ
x1F37	ἷ ἷ ἷ ἷ ἷ	Ι Ι Ι Ι Ι	ἷ ἷ ἷ ἷ ἷ
x1F38	Ἰ Ἰ Ἰ Ἰ Ἰ	Ι Ι Ι Ι Ι	ἰ ἰ ἰ ἰ ἰ
x1F39	Ἱ Ἱ Ἱ Ἱ Ἱ	Ι Ι Ι Ι Ι	ἱ ἱ ἱ ἱ ἱ
x1F3A	Ἲ Ἲ Ἲ Ἲ Ἲ	Ι Ι Ι Ι Ι	ἲ ἲ ἲ ἲ ἲ
x1F3B	Ἳ Ἳ Ἳ Ἳ Ἳ	Ι Ι Ι Ι Ι	ἳ ἳ ἳ ἳ ἳ
x1F3C	Ἴ Ἴ Ἴ Ἴ Ἴ	Ι Ι Ι Ι Ι	ἴ ἴ ἴ ἴ ἴ
x1F3D	Ἵ Ἵ Ἵ Ἵ Ἵ	Ι Ι Ι Ι Ι	ἵ ἵ ἵ ἵ ἵ
x1F3E	Ἶ Ἶ Ἶ Ἶ Ἶ	Ι Ι Ι Ι Ι	ἶ ἶ ἶ ἶ ἶ
x1F3F	Ἷ Ἷ Ἷ Ἷ Ἷ	Ι Ι Ι Ι Ι	ἷ ἷ ἷ ἷ ἷ
x1F40	ὀ ὀ ὀ ὀ ὀ	Ο Ο Ο Ο Ο	ὀ ὀ ὀ ὀ ὀ
x1F41	ὁ ὁ ὁ ὁ ὁ	Ο Ο Ο Ο Ο	ὁ ὁ ὁ ὁ ὁ
x1F42	ὂ ὂ ὂ ὂ ὂ	Ο Ο Ο Ο Ο	ὂ ὂ ὂ ὂ ὂ
x1F43	ὃ ὃ ὃ ὃ ὃ	Ο Ο Ο Ο Ο	ὃ ὃ ὃ ὃ ὃ
x1F44	ὄ ὄ ὄ ὄ ὄ	Ο Ο Ο Ο Ο	ὄ ὄ ὄ ὄ ὄ
x1F45	ὅ ὅ ὅ ὅ ὅ	Ο Ο Ο Ο Ο	ὅ ὅ ὅ ὅ ὅ
x1F48	Ὀ Ὀ Ὀ Ὀ Ὀ	Ο Ο Ο Ο Ο	ὀ ὀ ὀ ὀ ὀ
x1F49	Ὁ Ὁ Ὁ Ὁ Ὁ	Ο Ο Ο Ο Ο	ὁ ὁ ὁ ὁ ὁ
x1F4A	Ὂ Ὂ Ὂ Ὂ Ὂ	Ο Ο Ο Ο Ο	ὂ ὂ ὂ ὂ ὂ
x1F4B	Ὃ Ὃ Ὃ Ὃ Ὃ	Ο Ο Ο Ο Ο	ὃ ὃ ὃ ὃ ὃ
x1F4C	Ὄ Ὄ Ὄ Ὄ Ὄ	Ο Ο Ο Ο Ο	ὄ ὄ ὄ ὄ ὄ
x1F4D	Ὅ Ὅ Ὅ Ὅ Ὅ	Ο Ο Ο Ο Ο	ὅ ὅ ὅ ὅ ὅ
x1F50	ὐ ὐ ὐ ὐ ὐ	Υ Υ Υ Υ Υ	ὐ ὐ ὐ ὐ ὐ
x1F51	ὑ ὑ ὑ ὑ ὑ	Υ Υ Υ Υ Υ	ὑ ὑ ὑ ὑ ὑ
x1F52	ὒ ὒ ὒ ὒ ὒ	Υ Υ Υ Υ Υ	ὒ ὒ ὒ ὒ ὒ
x1F53	ὓ ὓ ὓ ὓ ὓ	Υ Υ Υ Υ Υ	ὓ ὓ ὓ ὓ ὓ
x1F54	ὔ ὔ ὔ ὔ ὔ	Υ Υ Υ Υ Υ	ὔ ὔ ὔ ὔ ὔ
x1F55	ὕ ὕ ὕ ὕ ὕ	Υ Υ Υ Υ Υ	ὕ ὕ ὕ ὕ ὕ
x1F56	ὖ ὖ ὖ ὖ ὖ	Υ Υ Υ Υ Υ	ὖ ὖ ὖ ὖ ὖ
x1F57	ὗ ὗ ὗ ὗ ὗ	Υ Υ Υ Υ Υ	ὗ ὗ ὗ ὗ ὗ
x1F59	Ὑ Ὑ Ὑ Ὑ Ὑ	Υ Υ Υ Υ Υ	ὑ ὑ ὑ ὑ ὑ
x1F5B	Ὓ Ὓ Ὓ Ὓ Ὓ	Υ Υ Υ Υ Υ	ὓ ὓ ὓ ὓ ὓ
x1F5D	Ὕ Ὕ Ὕ Ὕ Ὕ	Υ Υ Υ Υ Υ	ὕ ὕ ὕ ὕ ὕ

x1F5F	῟Υ ῟Υ ῟Υ ῟Υ ῟Υ	Υ Υ Υ Υ	῟ ῟ ῟ ῟ ῟
x1F60	ὠ ὠ ὠ ὠ ὠ	Ω Ω Ω Ω Ω	ὠ ὠ ὠ ὠ ὠ
x1F61	ὡ ὡ ὡ ὡ ὡ	Ω Ω Ω Ω Ω	ὡ ὡ ὡ ὡ ὡ
x1F62	ὢ ὢ ὢ ὢ ὢ	Ω Ω Ω Ω Ω	ὢ ὢ ὢ ὢ ὢ
x1F63	ὣ ὣ ὣ ὣ ὣ	Ω Ω Ω Ω Ω	ὣ ὣ ὣ ὣ ὣ
x1F64	ὤ ὤ ὤ ὤ ὤ	Ω Ω Ω Ω Ω	ὤ ὤ ὤ ὤ ὤ
x1F65	ὥ ὥ ὥ ὥ ὥ	Ω Ω Ω Ω Ω	ὥ ὥ ὥ ὥ ὥ
x1F66	ὦ ὦ ὦ ὦ ὦ	Ω Ω Ω Ω Ω	ὦ ὦ ὦ ὦ ὦ
x1F67	ὧ ὧ ὧ ὧ ὧ	Ω Ω Ω Ω Ω	ὧ ὧ ὧ ὧ ὧ
x1F68	Ὠ Ὠ Ὠ Ὠ Ὠ	Ω Ω Ω Ω Ω	ὠ ὠ ὠ ὠ ὠ
x1F69	Ὡ Ὡ Ὡ Ὡ Ὡ	Ω Ω Ω Ω Ω	ὡ ὡ ὡ ὡ ὡ
x1F6A	Ὢ Ὢ Ὢ Ὢ Ὢ	Ω Ω Ω Ω Ω	ὢ ὢ ὢ ὢ ὢ
x1F6B	Ὣ Ὣ Ὣ Ὣ Ὣ	Ω Ω Ω Ω Ω	ὣ ὣ ὣ ὣ ὣ
x1F6C	Ὤ Ὤ Ὤ Ὤ Ὤ	Ω Ω Ω Ω Ω	ὤ ὤ ὤ ὤ ὤ
x1F6D	Ὥ Ὥ Ὥ Ὥ Ὥ	Ω Ω Ω Ω Ω	ὥ ὥ ὥ ὥ ὥ
x1F6E	Ὦ Ὦ Ὦ Ὦ Ὦ	Ω Ω Ω Ω Ω	ὦ ὦ ὦ ὦ ὦ
x1F6F	Ὧ Ὧ Ὧ Ὧ Ὧ	Ω Ω Ω Ω Ω	ὧ ὧ ὧ ὧ ὧ
x1F70	ὰ ὰ ὰ ὰ ὰ	A A A A A	ὰ ὰ ὰ ὰ ὰ
x1F71	ά ά ά ά ά	A A A A A	ά ά ά ά ά
x1F72	ὲ ὲ ὲ ὲ ὲ	E E E E E	ὲ ὲ ὲ ὲ ὲ
x1F73	έ έ έ έ έ	E E E E E	έ έ έ έ έ
x1F74	ὴ ὴ ὴ ὴ ὴ	H H H H H	ὴ ὴ ὴ ὴ ὴ
x1F75	ή ή ή ή ή	H H H H H	ή ή ή ή ή
x1F76	ὶ ὶ ὶ ὶ ὶ	I I I I I	ὶ ὶ ὶ ὶ ὶ
x1F77	ί ί ί ί ί	I I I I I	ί ί ί ί ί
x1F78	ὸ ὸ ὸ ὸ ὸ	O O O O O	ὸ ὸ ὸ ὸ ὸ
x1F79	ό ό ό ό ό	O O O O O	ό ό ό ό ό
x1F7A	ὺ ὺ ὺ ὺ ὺ	Υ Υ Υ Υ Υ	ὺ ὺ ὺ ὺ ὺ
x1F7B	ύ ύ ύ ύ ύ	Υ Υ Υ Υ Υ	ύ ύ ύ ύ ύ
x1F7C	ὼ ὼ ὼ ὼ ὼ	Ω Ω Ω Ω Ω	ὼ ὼ ὼ ὼ ὼ
x1F7D	ώ ώ ώ ώ ώ	Ω Ω Ω Ω Ω	ώ ώ ώ ώ ώ
x1F80	ᾀ ᾀ ᾀ ᾀ ᾀ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾀ ᾀ ᾀ ᾀ ᾀ
x1F81	ᾁ ᾁ ᾁ ᾁ ᾁ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾁ ᾁ ᾁ ᾁ ᾁ
x1F82	ᾂ ᾂ ᾂ ᾂ ᾂ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾂ ᾂ ᾂ ᾂ ᾂ
x1F83	ᾃ ᾃ ᾃ ᾃ ᾃ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾃ ᾃ ᾃ ᾃ ᾃ
x1F84	ᾄ ᾄ ᾄ ᾄ ᾄ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾄ ᾄ ᾄ ᾄ ᾄ
x1F85	ᾅ ᾅ ᾅ ᾅ ᾅ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾅ ᾅ ᾅ ᾅ ᾅ
x1F86	ᾆ ᾆ ᾆ ᾆ ᾆ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾆ ᾆ ᾆ ᾆ ᾆ
x1F87	ᾇ ᾇ ᾇ ᾇ ᾇ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾇ ᾇ ᾇ ᾇ ᾇ
x1F88	ᾈ ᾈ ᾈ ᾈ ᾈ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾀ ᾀ ᾀ ᾀ ᾀ
x1F89	ᾉ ᾉ ᾉ ᾉ ᾉ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾁ ᾁ ᾁ ᾁ ᾁ
x1F8A	ᾊ ᾊ ᾊ ᾊ ᾊ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾂ ᾂ ᾂ ᾂ ᾂ
x1F8B	ᾋ ᾋ ᾋ ᾋ ᾋ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾃ ᾃ ᾃ ᾃ ᾃ
x1F8C	ᾌ ᾌ ᾌ ᾌ ᾌ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾄ ᾄ ᾄ ᾄ ᾄ
x1F8D	ᾍ ᾍ ᾍ ᾍ ᾍ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾅ ᾅ ᾅ ᾅ ᾅ
x1F8E	ᾎ ᾎ ᾎ ᾎ ᾎ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾆ ᾆ ᾆ ᾆ ᾆ
x1F8F	ᾏ ᾏ ᾏ ᾏ ᾏ	A$_I$ A$_I$ A$_I$ A$_I$ A$_I$	ᾇ ᾇ ᾇ ᾇ ᾇ
x1F90	ᾐ ᾐ ᾐ ᾐ ᾐ	H$_I$ H$_I$ H$_I$ H$_I$ H$_I$	ᾐ ᾐ ᾐ ᾐ ᾐ
x1F91	ᾑ ᾑ ᾑ ᾑ ᾑ	H$_I$ H$_I$ H$_I$ H$_I$ H$_I$	ᾑ ᾑ ᾑ ᾑ ᾑ

x1F92	ἢ ἢ ἢ ἢ ἢ	Ἢ Ἢ Ἢ Ἢ Ἢ	ᾒ ᾒ ᾒ ᾒ ᾒ
x1F93	ἣ ἣ ἣ ἣ ἣ	Ἣ Ἣ Ἣ Ἣ Ἣ	ᾓ ᾓ ᾓ ᾓ ᾓ
x1F94	ἤ ἤ ἤ ἤ ἤ	Ἤ Ἤ Ἤ Ἤ Ἤ	ᾔ ᾔ ᾔ ᾔ ᾔ
x1F95	ἥ ἥ ἥ ἥ ἥ	Ἥ Ἥ Ἥ Ἥ Ἥ	ᾕ ᾕ ᾕ ᾕ ᾕ
x1F96	ἦ ἦ ἦ ἦ ἦ	Ἦ Ἦ Ἦ Ἦ Ἦ	ᾖ ᾖ ᾖ ᾖ ᾖ
x1F97	ἧ ἧ ἧ ἧ ἧ	Ἧ Ἧ Ἧ Ἧ Ἧ	ᾗ ᾗ ᾗ ᾗ ᾗ
x1F98	ᾘ ᾘ ᾘ ᾘ ᾘ	Ἠ Ἠ Ἠ Ἠ Ἠ	ᾐ ᾐ ᾐ ᾐ ᾐ
x1F99	ᾙ ᾙ ᾙ ᾙ ᾙ	Ἡ Ἡ Ἡ Ἡ Ἡ	ᾑ ᾑ ᾑ ᾑ ᾑ
x1F9A	ᾚ ᾚ ᾚ ᾚ ᾚ	Ἢ Ἢ Ἢ Ἢ Ἢ	ᾒ ᾒ ᾒ ᾒ ᾒ
x1F9B	ᾛ ᾛ ᾛ ᾛ ᾛ	Ἣ Ἣ Ἣ Ἣ Ἣ	ᾓ ᾓ ᾓ ᾓ ᾓ
x1F9C	ᾜ ᾜ ᾜ ᾜ ᾜ	Ἤ Ἤ Ἤ Ἤ Ἤ	ᾔ ᾔ ᾔ ᾔ ᾔ
x1F9D	ᾝ ᾝ ᾝ ᾝ ᾝ	Ἥ Ἥ Ἥ Ἥ Ἥ	ᾕ ᾕ ᾕ ᾕ ᾕ
x1F9E	ᾞ ᾞ ᾞ ᾞ ᾞ	Ἦ Ἦ Ἦ Ἦ Ἦ	ᾖ ᾖ ᾖ ᾖ ᾖ
x1F9F	ᾟ ᾟ ᾟ ᾟ ᾟ	Ἧ Ἧ Ἧ Ἧ Ἧ	ᾗ ᾗ ᾗ ᾗ ᾗ
x1FA0	ὠ ὠ ὠ ὠ ὠ	Ὠ Ὠ Ὠ Ὠ Ὠ	ᾠ ᾠ ᾠ ᾠ ᾠ
x1FA1	ὡ ὡ ὡ ὡ ὡ	Ὡ Ὡ Ὡ Ὡ Ὡ	ᾡ ᾡ ᾡ ᾡ ᾡ
x1FA2	ὢ ὢ ὢ ὢ ὢ	Ὢ Ὢ Ὢ Ὢ Ὢ	ᾢ ᾢ ᾢ ᾢ ᾢ
x1FA3	ὣ ὣ ὣ ὣ ὣ	Ὣ Ὣ Ὣ Ὣ Ὣ	ᾣ ᾣ ᾣ ᾣ ᾣ
x1FA4	ὤ ὤ ὤ ὤ ὤ	Ὤ Ὤ Ὤ Ὤ Ὤ	ᾤ ᾤ ᾤ ᾤ ᾤ
x1FA5	ὥ ὥ ὥ ὥ ὥ	Ὥ Ὥ Ὥ Ὥ Ὥ	ᾥ ᾥ ᾥ ᾥ ᾥ
x1FA6	ὦ ὦ ὦ ὦ ὦ	Ὦ Ὦ Ὦ Ὦ Ὦ	ᾦ ᾦ ᾦ ᾦ ᾦ
x1FA7	ὧ ὧ ὧ ὧ ὧ	Ὧ Ὧ Ὧ Ὧ Ὧ	ᾧ ᾧ ᾧ ᾧ ᾧ
x1FA8	ᾨ ᾨ ᾨ ᾨ ᾨ	Ὠ Ὠ Ὠ Ὠ Ὠ	ᾠ ᾠ ᾠ ᾠ ᾠ
x1FA9	ᾩ ᾩ ᾩ ᾩ ᾩ	Ὡ Ὡ Ὡ Ὡ Ὡ	ᾡ ᾡ ᾡ ᾡ ᾡ
x1FAA	ᾪ ᾪ ᾪ ᾪ ᾪ	Ὢ Ὢ Ὢ Ὢ Ὢ	ᾢ ᾢ ᾢ ᾢ ᾢ
x1FAB	ᾫ ᾫ ᾫ ᾫ ᾫ	Ὣ Ὣ Ὣ Ὣ Ὣ	ᾣ ᾣ ᾣ ᾣ ᾣ
x1FAC	ᾬ ᾬ ᾬ ᾬ ᾬ	Ὤ Ὤ Ὤ Ὤ Ὤ	ᾤ ᾤ ᾤ ᾤ ᾤ
x1FAD	ᾭ ᾭ ᾭ ᾭ ᾭ	Ὥ Ὥ Ὥ Ὥ Ὥ	ᾥ ᾥ ᾥ ᾥ ᾥ
x1FAE	ᾮ ᾮ ᾮ ᾮ ᾮ	Ὦ Ὦ Ὦ Ὦ Ὦ	ᾦ ᾦ ᾦ ᾦ ᾦ
x1FAF	ᾯ ᾯ ᾯ ᾯ ᾯ	Ὧ Ὧ Ὧ Ὧ Ὧ	ᾧ ᾧ ᾧ ᾧ ᾧ
x1FB0	ᾰ ᾰ ᾰ ᾰ	Ᾰ Ᾰ Ᾰ Ᾰ	ᾰ ᾰ ᾰ ᾰ
x1FB1	ᾱ ᾱ ᾱ ᾱ	Ᾱ Ᾱ Ᾱ Ᾱ	ᾱ ᾱ ᾱ ᾱ
x1FB2	ᾲ ᾲ ᾲ ᾲ ᾲ	Ὰ Ὰ Ὰ Ὰ Ὰ	ᾲ ᾲ ᾲ ᾲ ᾲ
x1FB3	ᾳ ᾳ ᾳ ᾳ ᾳ	ΑΙ ΑΙ ΑΙ ΑΙ ΑΙ	ᾳ ᾳ ᾳ ᾳ ᾳ
x1FB4	ᾴ ᾴ ᾴ ᾴ ᾴ	ΆΙ ΆΙ ΆΙ ΆΙ ΆΙ	ᾴ ᾴ ᾴ ᾴ ᾴ
x1FB6	ᾶ ᾶ ᾶ ᾶ ᾶ	Α͂ Α͂ Α͂ Α͂ Α͂	ᾶ ᾶ ᾶ ᾶ ᾶ
x1FB7	ᾷ ᾷ ᾷ ᾷ ᾷ	Α͂Ι Α͂Ι Α͂Ι Α͂Ι Α͂Ι	ᾷ ᾷ ᾷ ᾷ ᾷ
x1FB8	Ᾰ Ᾰ Ᾰ Ᾰ	Ᾰ Ᾰ Ᾰ Ᾰ	ᾰ ᾰ ᾰ ᾰ
x1FB9	Ᾱ Ᾱ Ᾱ Ᾱ	Ᾱ Ᾱ Ᾱ Ᾱ	ᾱ ᾱ ᾱ ᾱ
x1FBA	Ὰ Ὰ Ὰ Ὰ Ὰ	Ὰ Ὰ Ὰ Ὰ Ὰ	ὰ ὰ ὰ ὰ ὰ
x1FBB	Ά Ά Ά Ά Ά	Ά Ά Ά Ά Ά	ά ά ά ά ά
x1FBC	ᾼ ᾼ ᾼ ᾼ ᾼ	ᾼ ᾼ ᾼ ᾼ ᾼ	ᾳ ᾳ ᾳ ᾳ ᾳ
x1FBD	᾽ ᾽ ᾽ ᾽	᾽	᾽ ᾽ ᾽ ᾽
x1FBE	ι ι ι ι ι	Ι ι ι ι ι	ι ι ι ι ι
x1FBF	᾿ ᾿ ᾿ ᾿	᾿	᾿ ᾿ ᾿ ᾿
x1FC0	῀ ῀ ῀ ῀	῀	῀ ῀ ῀ ῀
x1FC1	῁ ῁ ῁ ῁ ῁ ῁ ῁	῁ .... , ,	῁ ῁ ῁ ῁ ῁ ῁ ῁
x1FC2	ῂ ῂ ῂ ῂ ῂ	Ὴ Ὴ Ὴ Ὴ Ὴ	ῂ ῂ ῂ ῂ ῂ
x1FC3	ῃ ῃ ῃ ῃ ῃ	ΗΙ ΗΙ ΗΙ ΗΙ ΗΙ	ῃ ῃ ῃ ῃ ῃ
x1FC4	ῄ ῄ ῄ ῄ ῄ	ΉΙ ΉΙ ΉΙ ΉΙ ΉΙ	ῄ ῄ ῄ ῄ ῄ

7

x1FC6	ῆ ῆ ῆ ῆ ῆ	H H H H H	ῆ ῆ ῆ ῆ ῆ
x1FC7	ῇ ῇ ῇ ῇ ῇ	Hᵢ Hᵢ Hᵢ Hᵢ Hᵢ	ῇ ῇ ῇ ῇ ῇ
x1FC8	Ὲ Ὲ Ὲ Ὲ Ὲ	E E E E E	ὲ ὲ ὲ ὲ
x1FC9	Έ Έ Έ Έ Έ	E E E E E	έ έ έ έ
x1FCA	Ὴ Ὴ Ὴ Ὴ Ὴ	H H H H H	ὴ ὴ ὴ ὴ ὴ
x1FCB	Ή Ή Ή Ή Ή	H H H H H	ή ή ή ή ή
x1FCC	ῌ ῌ ῌ ῌ ῌ	Hᵢ Hᵢ Hᵢ Hᵢ Hᵢ	ῃ ῃ ῃ ῃ ῃ
x1FCD	῍ ῍ ῍ ῍ ῍ ῍	῍	῍ ῍ ῍ ῍ ῍ ῍
x1FCE	῎ ῎ ῎ ῎ ῎ ῎	῎	῎ ῎ ῎ ῎ ῎ ῎
x1FCF	῏ ῏ ῏ ῏ ῏ ῏	῏	῏ ῏ ῏ ῏ ῏ ῏
x1FD0	ῐ ῐ ῐ ῐ	Ῐ Ῐ Ῐ Ῐ	ῐ ῐ ῐ ῐ
x1FD1	ῑ ῑ ῑ ῑ	Ῑ Ῑ Ῑ Ῑ	ῑ ῑ ῑ ῑ
x1FD2	ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ	Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ	ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ ῒ
x1FD3	ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ	Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ	ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ ΐ
x1FD6	ῖ ῖ ῖ ῖ ῖ	I I I I I	ῖ ῖ ῖ ῖ ῖ
x1FD7	ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ	Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ Ῐ	ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ ῗ
x1FD8	Ῐ Ῐ Ῐ Ῐ	Ῐ Ῐ Ῐ Ῐ	ῐ ῐ ῐ ῐ
x1FD9	Ῑ Ῑ Ῑ Ῑ	Ῑ Ῑ Ῑ Ῑ	ῑ ῑ ῑ ῑ
x1FDA	Ὶ Ὶ Ὶ Ὶ Ὶ	I I I I I	ὶ ὶ ὶ ὶ ὶ
x1FDB	Ί Ί Ί Ί Ί	I I I I I	ί ί ί ί ί
x1FDD	῝ ῝ ῝ ῝ ῝ ῝ ῝	῝	῝ ῝ ῝ ῝ ῝ ῝ ῝
x1FDE	῞ ῞ ῞ ῞ ῞ ῞	῞	῞ ῞ ῞ ῞ ῞ ῞
x1FDF	῟ ῟ ῟ ῟ ῟ ῟	῟	῟ ῟ ῟ ῟ ῟ ῟
x1FE0	ῠ ῠ ῠ ῠ	Ῠ Ῠ Ῠ Ῠ	ῠ ῠ ῠ ῠ
x1FE1	ῡ ῡ ῡ ῡ	Ῡ Ῡ Ῡ Ῡ	ῡ ῡ ῡ ῡ
x1FE2	ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ	Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ	ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ ῢ
x1FE3	ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ	Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ	ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ ΰ
x1FE4	ῤ ῤ ῤ ῤ ῤ	P P P P P	ῤ ῤ ῤ ῤ ῤ
x1FE5	ῥ ῥ ῥ ῥ ῥ	P P P P P	ῥ ῥ ῥ ῥ ῥ
x1FE6	ῦ ῦ ῦ ῦ ῦ	Υ Υ Υ Υ Υ	ῦ ῦ ῦ ῦ ῦ
x1FE7	ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ	Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ Ῠ	ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ ῧ
x1FE8	Ῠ Ῠ Ῠ Ῠ	Ῠ Ῠ Ῠ Ῠ	ῠ ῠ ῠ ῠ
x1FE9	Ῡ Ῡ Ῡ Ῡ	Ῡ Ῡ Ῡ Ῡ	ῡ ῡ ῡ ῡ
x1FEA	Ὺ Ὺ Ὺ Ὺ Ὺ	Υ Υ Υ Υ Υ	ὺ ὺ ὺ ὺ ὺ
x1FEB	Ύ Ύ Ύ Ύ Ύ	Υ Υ Υ Υ Υ	ύ ύ ύ ύ ύ
x1FEC	Ῥ Ῥ Ῥ Ῥ Ῥ	P P P P P	ῥ ῥ ῥ ῥ ῥ
x1FED	῭ ῭ ῭ ῭ ῭ ῭ ῭ ῭	῭ .... , ,	῭ ῭ ῭ ῭ ῭ ῭ ῭ ῭
x1FEE	΅ ΅ ΅ ΅ ΅ ΅ ΅ ΅	΅ .... , ,	΅ ΅ ΅ ΅ ΅ ΅ ΅ ΅
x1FEF	` ` ` `	`	` ` ` `
x1FF2	ῲ ῲ ῲ ῲ ῲ	Ωᵢ Ωᵢ Ωᵢ Ωᵢ Ωᵢ	ῲ ῲ ῲ ῲ ῲ
x1FF3	ῳ ῳ ῳ ῳ ῳ	Ωᵢ Ωᵢ Ωᵢ Ωᵢ Ωᵢ	ῳ ῳ ῳ ῳ ῳ
x1FF4	ῴ ῴ ῴ ῴ ῴ	Ωᵢ Ωᵢ Ωᵢ Ωᵢ Ωᵢ	ῴ ῴ ῴ ῴ ῴ
x1FF6	ῶ ῶ ῶ ῶ ῶ	Ω Ω Ω Ω Ω	ῶ ῶ ῶ ῶ ῶ
x1FF7	ῷ ῷ ῷ ῷ ῷ	Ωᵢ Ωᵢ Ωᵢ Ωᵢ Ωᵢ	ῷ ῷ ῷ ῷ ῷ
x1FF8	Ὸ Ὸ Ὸ Ὸ Ὸ	O O O O O	ὸ ὸ ὸ ὸ ὸ
x1FF9	Ό Ό Ό Ό Ό	O O O O O	ό ό ό ό ό
x1FFA	Ὼ Ὼ Ὼ Ὼ Ὼ	Ω Ω Ω Ω Ω	ὼ ὼ ὼ ὼ ὼ
x1FFB	Ώ Ώ Ώ Ώ Ώ	Ω Ω Ω Ω Ω	ώ ώ ώ ώ ώ
x1FFC	ῼ ῼ ῼ ῼ ῼ	Ωᵢ Ωᵢ Ωᵢ Ωᵢ Ωᵢ	ῳ ῳ ῳ ῳ ῳ
x1FFD	´ ´ ´ ´	´	´ ´ ´ ´

4   Discussion

4.1   Pre-composed vs. combining characters

Under pdfTeX and XeTeX, all input variants select pre-composed characters if possible (using the NFC Unicode normalization with XeTeX and ligature definitions in LGR fonts under pdfTeX).

The default LuaTeX renderer does no NFC normalization. This leads to sub-optimal placement of diacritics with many fonts, often resulting in illegible output. NFC normalization for LuaTeX is provided by the *uninormalize* package and, alternatively, by the *Harfbuzz* renderer that can be selected with the `[Renderer=Harfbuzz]` option of the *fontspec* font selection commands. This document uses the Harfbuzz renderer with LuaTeX.

4.2   Case changing

4.2.1   Diacritics

According to Greek typographical conventions, most[4] diacritics are dropped in UP-PERCASE. Up to 2022, `\MakeUppercase` dropped diacritics from Greek letters in any locale (except for standard accent macros).

For *literal characters*, the new `\MakeUppercase` implementation follows the Unicode standard, where dropping diacritics is a feature of the Greek locale ("el"). However, *accent macros* behave according to Greek typesetting rules in *all* locales (standard accent macros only in documents that declare the Greek language with Babel).

Since version 1.14, babel-greek maps standard accent macros to "capital" versions to fix uppercasing accented Greek letters with the new `\MakeUppercase`. The default expansion ensures that accents are kept on Latin letters: á è ï õ ú → Á È Ï Õ Ú. It also works if the Language is set to Greek: á è ï õ ú → Á È Ï Õ Ú. (Mind, that with 8-bit TeX Latin letters are interpreted as transliteration input and converted to Greek if not wrapped in `\ensureascii`: ά ὲ ϊ õ ύ → A E Ϊ O Υ.)

4.2.2   Sigma, final sigma, and "autosigma"

There are two variants of the small letter *sigma*.

Lowercasing a capital Σ at the end of a word should print a final sigma. This works as expected with 8-bit TeX and, since 2022, also with Xe/LuaTeX and a literal Sigma: ΣΣ → σς. However, it fails with the `\textSigma` macro and Unicode fonts: ΣΣ → σς.

With 8-bit TeX, you can add a ZWNJ or use the `\noboundary` macro to prevent the conversion to a final sigma: σσ.

4.2.3   The "disjunctive eta" ἤ (*or*)

In order to disambiguate the nominative feminine article η (ἡ) from the conjunction ἤ (ἤ), the latter should keep an accent in uppercase.[5]

---

[4]Exceptions are the diaeresis, the sub-iota, and the length markers macron (¯) and breve (˘). The length markers are used in dictionaries and textbooks but not part of the Greek orthography. There is no established practice regarding their handling in uppercase. LaTeX keeps them but the Unicode reference implementation drops them.

[5]https://icu.unicode.org/design/case/greek-upper

- The *feminine nominative singular article* in monotonic Greek is written as an Eta without any diacritics (η). In polytonic Greek, it takes a rough breathing (dasia, ἡ), eventually with an additional accent (ἤ or ἦ)[6] to mark stress.

  Uppercasing should drop diacritics: ή ἤ ἢ Ἡ Ἤ Ἦ Η → Η Η Η Η Η Η Η (OK).

- The disjunctive eta (διαζευτικό ήτα)[7] can be translated as *or*. In monotonic Greek, it is written with a tonos (ή), in polytonic Greek with a smooth breathing (psili) and either oxia (ἤ), varia (ἢ), or perispomeni (ἦ).

  Uppercase should keep an accent on the "disjunctive eta".

The 2022 MakeUppercase implements this rule for literal ή, ἢ, Ἡ, and Ἦ:

$$ ή ἢ ἤ ἤ Ἡ Ἦ Ἤ Ἦ → Ή Ή Η Η Ή Ή Η Η . $$

Diacritics are dropped from Eta if it is part of a word:

ήτοι, Ήτοι, επιταγή ήτοι, Ήτοι → ΗΤΟΙ, ΗΤΟΙ, ΕΠΙΤΑΓΗ ΗΤΟΙ, ΗΤΟΙ.

TODO (see also examples below)

- The "disjunctive eta" rule is well documented for monotonic Greek. There is no available source specifying it for polytonic Greek.

  The variants with oxia and perispomeni (ἤ, ἦ, Ἤ, and Ἦ) drop diacritics.

  By mistake, omission (in texts, the spelling variant ἢ is used in the majority of cases), or intent (is the accent required for disambiguation in use cases with oxia or perispomeni)?

- The characters drop diacritics if followed by punctuation and at the end of embedded markup or the to-be-capitalized string: ἡ, Ἡ. ἢ· ή Ἤ → Η, Η. Η· *H* Η

  Is the accent required if punctuation follows? (Punctuation may suffice for disambiguation as the feminine article is usually directly followed by a noun.)

  A trailing space helps: ή ή → Ή Ή

- Currently, this feature is not supported with LICR input.

Examples in ancient Greek (should be checked by a Greek linguist/typographer)

Psili and varia replaced with tonos:

ἐλαφρότεροι ἢ ἀφνειότεροι → ΕΛΑΦΡΟΤΕΡΟΙ Ή ΑΦΝΕΙΟΤΕΡΟΙ

ἢ αὐτός → Ή ΑΥΤΟΣ

ἤκουσας ἢ οὐκ ἤκουσας ἢ κωφῇ λέγω· → ΗΚΟΥΣΑΣ Ή ΟΥΚ ΗΚΟΥΣΑΣ Ή ΚΩΦΗͺ ΛΕΓΩ·

Diacritics dropped from ETA WITH PSILI AND OXIA (relevant? typos?):

ἤ πῶς δύνασαι λέγειν τῷ ἀδελφῷ . . . → Η ΠΩΣ ΔΥΝΑΣΑΙ ΛΕΓΕΙΝ ΤΩͺ ΑΔΕΛΦΩͺ . . .

εἰ τύχοι σίτου ἤ τινος τῶν λοιπῶν· → ΕΙ ΤΥΧΟΙ ΣΙΤΟΥ Η ΤΙΝΟΣ ΤΩΝ ΛΟΙΠΩΝ·

ὅτι οὐ πλείους εἰσίν μοι ἡμέραι ἤ δεκαδύο,

Diacritics dropped from ETA WITH PSILI AND PERISPOMENI:

---

[6] The grave was originally written on all unaccented syllables. By the Byzantine period it was only used to replace the acute at the end of a word if another accented word follows immediately without punctuation. https://en.wikipedia.org/wiki/Greek_diacritics

[7] https://en.wiktionary.org/wiki/ἤ

ἢ δολιχὴ νοῦσος ἢ Ἄρτεμις ἰοχέαιρα ... κατέπεφνεν· → Ἡ ΔΟΛΙΧΗ ΝΟΥ-
ΣΟΣ Η ΑΡΤΕΜΙΣ ΙΟΧΕΑΙΡΑ ... ΚΑΤΕΠΕΦΝΕΝ·

Diacritics dropped before punctuation (may be OK):

μὴ οὖν μεριμνήσητε λέγοντες, Τί φάγωμεν· ἤ, Τί πίωμεν· ἤ, Τί περιβαλώμε-
θα· → ΜΗ ΟΥΝ ΜΕΡΙΜΝΗΣΗΤΕ ΛΕΓΟΝΤΕΣ, ΤΙ ΦΑΓΩΜΕΝ· Η, ΤΙ
ΠΙΩΜΕΝ· Η, ΤΙ ΠΕΡΙΒΑΛΩΜΕΘΑ·

4.2.4   Case conversion if the locale is *not* Greek

Since 2022, `\MakeUppercase` keeps diacritics on Greek letters and uses combining dia-
critical characters for characters that have no pre-composed uppercase equivalent.

With Xe/LuaTeX, the result may be illegible due to overlapping diacritics. With
pdfTeX, this led to compiling errors. This is fixed in *greek-fontenc* 2.3. by mapping
the affected characters to macro representations before case conversions (requires the
2023 LaTeX release). Consequently, with pdfTeX, diacritics are dropped from literal
characters without pre-composed uppercase equivalent also if the text language is *not*
Greek.

ΐΰ̀ΰ̀ΰ̃ᾀ̣ᾀ̔ῄᾐῑ̈ὕ̇ῤ̣ΰ̃ῶ̣ῳ̇→ ΪΫ́ΥΥΥΥΑΑ̦ΗΗ̦ΙΪΙΪ̈ΫΫ́ΡΥ̓ΥΩΩ̦

4.2.5   PDF strings

MakeUppercase in PDF strings led to compiling errors until 2022.

Check the table of contents in the side-bar of a PDF viewer.

4.2.6   ΐ ΐ ΐΐΐΐ ΐ ΐ ΐ ΐ ΐ → Ϊ Ϊ ΪΪΪΪ Ϊ Ϊ Ϊ Ϊ

4.2.7   ΰ ΰ ΰΰΰΰ ΰ ΰ ΰ ΰ ΰ → Ϋ Ϋ ΫΫΫΫ Ϋ Ϋ Ϋ Ϋ Ϋ

4.2.8   ῒ ῒ ῒῒῒῒ ῒ ῒ ῒ ῒ ῒ → Ϊ Ϊ ΪΪΪΪ Ϊ Ϊ Ϊ Ϊ

4.2.9   ῢ ῢ ῢῢῢῢ ῢ ῢ ῢ ῢ ῢ → Ϋ Ϋ ΫΫΫΫ Ϋ Ϋ Ϋ Ϋ Ϋ

4.2.10   ᾓ ᾓ ᾕ ᾕ ᾗ ᾗ Ἣ Ἡ Ἧ Ἧ → Ἡ Η Η Η Η Η Η Η Η Ἡ Η

Transliteration input stays Latin in PDF strings.

Diacritics are not dropped from literal characters in text, ToC but not PDF sidebar
ToC, if the language switch is inside the `\section` command. (It works if the language
is switched before the section command.)

See hyperref-with-greek.pdf for a comprehensive test.

4.3   Symbol variants

For several Greek letters, there are alternative glyphs which may have a different se-
mantic in a mathematical context. Unicode reserves code points for the alternative
glyphs (naming them SYMBOL as opposed to LETTER). Some of these symbols are
available as `\var<name>` macros in TeX's mathematical mode.

In text, the alternative glyphs are considered typographical variants without special
meaning. The 8-bit LGR font encoding does not allocate code points for them. *Babel-
greek* and the *textalpha* package provide the `normalize-symbols` option (ignored with
Xe/LuaTeX) that is also used in this test document.

Test the handling of symbol variants in text

literal letter, LICR, `\var<name>`, `\<name>symbol`, literal symbol:
No case change

βββββ εεεεε ϑϑϑϑϑ ΘΘΘΘΘ ϰϰϰϰϰ πππππ ρρρρρ φφφφφ

MakeUppercase selects the matching capital letter:

BBBBB EEEEE ΘΘΘΘΘ ΘΘΘΘΘ ΚΚΚΚΚ ΠΠΠΠΠ ΡΡΡΡΡ ΦΦΦΦΦ

MakeLowercase selects the lowercase letter (not the symbol):

ββ εε ϑϑ ϑϑϑ ϰϰ ππ ρρ φφ.

LGR provides two lowercase variants of the archaic letter *stigma*. Both map to GREEK LETTER STIGMA Ϛ.

The lowercase of Ϛ is ϛ (`\textstigma`), not `\textvarstigma`(ϛ).

4.4 Hiatus

Tonos and psili mark a *hiatus* (break-up) if placed on the first of two vowels that would otherwise form a diphthong. A dialytika must be placed on the second vowel if they are dropped:

ἀι ἀυ ἐι ἄι ἄυ ἔι ἀυ → ΑΪ ΑΫ ΕΪ ΑΪ ΑΫ ΕΪ ΑΫ (literal)

ἀι ἀυ ἐι ἄι ἄυ ἔι ἀυ → ΑΪ ΑΫ ΕΪ ΑΪ ΑΫ ΕΪ ΑΫ (named+LICR)

ἀι ἀυ ἐι ἄι ἄυ ἔι ἀυ → ΑΪ ΑΫ ΕΪ ΑΪ ΑΫ ΕΪ ΑΫ (short+LICR)

ἀι ἀυ ἐι ἄι ἄυ ἔι ἀυ → ΑΪ ΑΫ ΕΪ ΑΪ ΑΫ ΕΪ ΑΫ (short+transliteration)

ἄι ἄυ ἔι → ΑΪ ΑΫ ΕΪ (short+transliteration, reversed)

The "hiatus feature" does not work with the LGR "input ligatures". Support for monotonic literal characters came with the 2022 `\MakeUppercase` implementation changes. Since 2023 it also works with polytonic literals (ἀυπνία → ΑΫΠΝΙΑ).

Test the auto-hiatus feature for side-effects:

A B (must keep space after A).

Kerning (compare with source):

AO AΨ AI AΥ PA OA ΥA ΔΥ [
˙ AO AΨ AI AΥ PA OA ΥA ΔΥ [
᾿ AO AΨ AΪ AΫ PA OA ΥA ΔΥ [
῍ AO AΨ AΪ AΫ PA OA ΥA ΔΥ [
´ AO AΨ AΪ AΫ PA OA ΥA ΔΥ [
῎ AO AΨ AΪ AΫ PA OA ΥA ΔΥ [
῝ AO AΨ AI AΥ PA OA ΥA ΔΥ [
` AO AΨ AI AΥ PA OA ΥA ΔΥ [
῏ AO AΨ AI AΥ PA OA ΥA ΔΥ [
˜ AO AΨ AI AΥ PA OA ΥA ΔΥ [
῞ AO AΨ AI AΥ PA OA ΥA ΔΥ [
῟ AO AΨ AI AΥ PA OA ΥA ΔΥ [
῾ AO AΨ AI AΥ PA OA ΥA ΔΥ [
¨ AO AΨ AΪ AΫ PA OA ΫA ΔΥ [

Rows 3 ... 7: Look-ahead (to check for a hiatus) breaks kerning before 'A' with tonos or psili.

Lowercasing should keep diacritics (of course, it cannot regenerate "manually" dropped ones): Ά Ϊ Ϋ Ά ↦ ά ϊ ϋ ἄ.

4.5 Problems with the Latin transliteration

- With monotonic Greek or if `\greekfontencoding` is not LGR, the tilde ~ keeps its default expansion as no-break space (NBSP) and transliterations involving ~ fail. If the `greek` language is loaded with Babel, the tilde accent `\~` as well as combined accents involving the tilde work in all language variants.

- In order to drop accents from input using the Latin transliteration, the characters ', `, ~, <, and > are suppressed in uppercase. This affects other uses of these characters:

  « ` ´ ~ ‘ ’ » → «   »   '‘ξ’ → Ξ

  Workaround: use literal typographical quote characters or "french" quotes:

  '‘ξ’ → ‘Ξ’   «ξ» → «Ξ»

  To keep side-effects to a minimum, breathings, combined accents and varia are dropped only with the language variants *polutoniko* or *ancient* as they are not required with monotonic Greek (the current language variant is polutoniko).

- The uppercase of spacing composite diacritics including a dialytika "~ "‘ "’ appears as apostrophe, as a single " stands for an apostrophe in the LGR transliteration if followed by a space or empty character.