

Hyphenation Patterns for Ancient and Modern Greek

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Abstract

Several files with Greek hyphenation patterns for \TeX can be found on CTAN. However, most of these patterns are for use with Modern Greek texts only. Some of these patterns contain mistakes or are incomplete. Other patterns are suitable only for some now-outdated “Greek \TeX ” packages. In 2000, after having examined the patterns that existed already, the author made new sets of hyphenation patterns for typesetting Ancient and Modern Greek texts with the `greek` option of the `babel` package or with Dryllerakis’ `Greek \TeX` package. Lately, these patterns have found their way even into the `ibycus` package, which can be used with the *Thesaurus Linguae Graecae*, and into Ω with the `antomega` package.

The new hyphenation patterns, while not exhaustive, do respect the grammatical and phonetic rules of three distinct Greek writing systems. In general, all Greek words are hyphenated after a vowel and before a consonant. However, for typesetting Ancient Greek texts, the hyphenation patterns follow the rules established in 1939 by the Academy of Athens, which allow for breaking up compound words between the last consonant of the first constituent word and the first letter of the second constituent word, provided that the first constituent word has not been changed by elision. For typesetting polytonic (multi-accent) Modern Greek texts, the hyphenation rules distinguish between the nasal and the non-nasal double consonants $\mu\pi$, $\nu\tau$, and $\gamma\chi$. In accordance with the latest Greek grammar rules, in monotonic (uni-accent) Modern Greek texts, these double consonants are not split.

1 Introduction

Before 2000, one could find on CTAN four different files with hyphenation patterns for Modern Greek only, namely

- `rgrhyph.tex` by Yannis Haralambous [1],
- `grkhyphen.tex` by Kostis Dryllerakis [2],
- `gehypen.tex` by Yiannis Moschovakis [3], and
- `grhyph.tex` by Claudio Beccari [4].

The first two hyphenation-pattern files [1, 2] are almost identical. The only difference is that the patterns by Dryllerakis contain an `\endinput` command several lines before the end-of-file. (Probably, Dryllerakis cut down Haralambous’ patterns to reduce memory usage, at a time when memory space was still rather limited.) The patterns by Moschovakis [3] are not only limited to Modern Greek, but they have been “frozen” based on an obsolete mixed US-Greek codepage for DOS and an equally obsolete \LaTeX 2.09. The end result is that some words

containing vowels with combined diacritical marks (e.g., $\epsilon\tilde{\iota}\delta\omicron\varsigma$, $\theta\epsilon\tilde{\omega}$, etc.) are not hyphenated at all.

Haralambous’ patterns [1] do not provide for the correct hyphenation of combinations of three or more consonants. In addition, they do not allow for the hyphenation of the nasal consonant combinations $\mu\pi$ (*mb*), $\nu\tau$ (*nd*) and $\gamma\chi$ (*ng*), which must be split in polytonic Modern Greek. Haralambous’ patterns erroneously split the combination $\tau\mu$ and prohibit the hyphenation of all final two-letter combinations for no apparent reason.

Beccari’s patterns [4], which are commonly used with the `greek` option of `babel`, contain a number of mistakes and are also incomplete. For example, the word $\pi\upsilon\chi\nu\acute{o}\tau\eta\tau\alpha$ is hyphenated as $\pi\upsilon\chi\text{-}\nu\acute{o}\text{-}\tau\eta\text{-}\tau\alpha$. According to some rules outlined further in this text, that word should have been hyphenated as $\pi\upsilon\text{-}\chi\nu\acute{o}\text{-}\tau\eta\text{-}\tau\alpha$. Similar bad hyphenations include $\iota\sigma\text{-}\theta\mu\acute{o}\varsigma$ (it should be $\iota\text{-}\sigma\theta\mu\acute{o}\varsigma$), $\text{\textbackslash}\lambda\chi\text{-}\mu\eta\text{-}\nu\eta$ (it should be $\text{\textbackslash}\lambda\text{-}\chi\mu\eta\text{-}\nu\eta$), etc. Beccari’s patterns also allow for separation of the consonant combinations $\delta\mu$, $\delta\nu$ and $\tau\lambda$. These

combinations should not be split, because one can find some Ancient Greek words that start with such combinations (δμῶς, δνοφερός, τλημωσύνη).

In 2000, while typesetting a large volume in polytonic Modern Greek, the author of the present article noticed the mishaps in Beccari’s hyphenation patterns and the inadequacy of all other Greek hyphenation patterns. He noticed also that hyphenation patterns for Ancient Greek, although they had been discussed by Haralambous back in 1992 [5], were not available at all in the public domain. That was the incentive for the author to revise the existing hyphenation patterns for Modern Greek and to provide in the public domain a set of hyphenation patterns for Ancient Greek.

The author has already presented these patterns in the newsletter of the Greek T_EX Friends [6, 7], but this communication is the first (and long overdue) presentation of the patterns to the global T_EX community. The patterns were created for the 1988 *de facto* Levy Greek encoding [8], which later became the Local Greek (LGR) encoding.

2 Creation of Patterns

One way to produce hyphenation patterns is by using PATGEN [9]. PATGEN scans a given database with hyphenated words and prepares a set of hyphenation patterns based on observations the programme has made. Another way of using PATGEN is modular [10]: first one creates a limited set of hyphenated words, then runs PATGEN on these words, checks the produced hyphenation patterns and expands the list of hyphenated words with those words that were badly hyphenated. The whole cycle *create word list–run PATGEN–check bad hyphenations–expand word list* is repeated until an acceptable set of hyphenation patterns is produced. To the author’s knowledge, an electronic dictionary with hyphenated words does not exist for Greek. Given the excessive morphology of the Greek words, even the modular use of PATGEN would be a daunting task. A less time-consuming effort is the translation of the simple grammatical rules for the hyphenation of Greek into patterns for the T_EX machine as it has already been done [1, 3, 4]. This is the solution chosen also by the author of the present article.

Each language has its rules and exceptions that must be duly respected. It is not rare for one language to have different hyphenation rules for different dialects, or to have different hyphenation rules for texts written in different eras. The best-known example is English, where some words are hyphenated differently depending on the continent (e.g.,

pre-face in British English and *pref-ace* in American English).

In the case of Greek, one has to distinguish—grossly—between three “dialects” that demand separate sets of hyphenation patterns:

1. Ancient Greek and old-style literate Modern Greek (*katharevousa*),
2. polytonic Modern Greek, and
3. monotonic Modern Greek.

Ancient Greek is considered essentially every text that has been written in Greek from Homeric times (8th century B.C.) to about the end of the Byzantine Empire (15th century A.D.). *Katharevousa* (literally, *the purifying*) is a formal written language (almost never spoken) conceived by Greek scholars in the period of the Enlightenment as a way to purify Modern Greek from foreign influences. It was used in Greek literature of the 19th and early 20th century, and by the Greek state from its creation in 1827 until 1976. It is still used by the Greek Orthodox Church.

Polytonic and monotonic Modern Greek are essentially the same language. The only difference is that polytonic (literally, *multi-accent*) Modern Greek uses all accents, breathings and diacritics of Ancient Greek and *katharevousa*, while monotonic (literally, *uni-accent*) Modern Greek, which was adopted officially in Greece in 1982, has just one accent mark (much to the dismay of some classicists).

The hyphenation rules for Ancient Greek and *katharevousa* have special provisos for compound words [11]. The hyphenation rules for polytonic Modern Greek make a distinction between nasal μπ, ντ and γχ (pronounced as *mb*, *nd* and *ng* respectively) and non-nasal μπ, ντ and γχ (pronounced as *b*, *d* and *g*) [12]. The hyphenation rules for monotonic Modern Greek do not distinguish between nasal and non-nasal μπ, ντ and γχ, nor do they make any special demand for compound words [13].

2.1 Patterns for Modern Greek

2.1.1 Monotonic Texts

The grammatical rules for the hyphenation of monotonic Modern Greek [13] and the corresponding hyphenation patterns are the following:

1. *One consonant between two vowels always remains together with the second vowel.* This rule can be seen slightly differently: a word is hyphenated after each vowel, for example, τη-λε-ό-ρα-ση. With the Levy character encoding [8], the corresponding hyphenation patterns are: a1 e1 h1 i1 o1 u1 w1.

2. *Double vowels* (diphthongs in Ancient Greek) that are pronounced as one are not hyphenated. Hence the double vowels α , $\acute{\alpha}$, $\alpha\nu$, etc. should not be split apart. The corresponding hyphenation patterns are: $\mathbf{a2i}$ $\mathbf{a2'i}$ $\mathbf{a2u}$... $\mathbf{u2i}$ $\mathbf{u2'i}$. However, when the first vowel is accented, the two vowels are to be pronounced separately and they can be hyphenated. Hence, we include some exceptions: $\mathbf{'a3u}$ $\mathbf{'e3u}$ $\mathbf{'o3u}$ $\mathbf{'u3i}$.

3. *Semi-vowels are not hyphenated.* Vowels, simple and double, that are usually pronounced as i are sometimes semi-vowels, i.e., they are not pronounced totally separately from the preceding or following vowel. Hence some vowel combinations involving semi-vowel sounds (j) should not be split apart. The most common semi-vowel combinations are: aj ($\nu\epsilon\text{-}\rho\acute{\alpha}\text{-}\delta\alpha$), ej ($\zeta\epsilon\acute{\iota}\text{-}\mu\pi\acute{\epsilon}\text{-}\kappa\eta\varsigma$) and oj ($\chi\omicron\text{-}\rho\acute{\omicron}\text{-}\delta\omicron$) when they are accented on the first vowel or when they are not accented at all, and the combinations ja ($\delta\iota\alpha\text{-}\beta\acute{\alpha}\zeta\omega$), je ($\epsilon\text{-}\lambda\iota\acute{\epsilon}\varsigma$) and jo ($M\alpha\text{-}\rho\acute{\iota}\omega$) when they are accented on the second vowel or when they are not accented at all. The resulting hyphenation patterns are: $\mathbf{a2h}$ $\mathbf{a2"i}$... $\mathbf{i2a}$ $\mathbf{i2'a}$... $\mathbf{u2w}$ $\mathbf{u2'w}$. Some notable exceptions are: $\mathbf{'a3h}$... $\mathbf{'u3w}$.

It is worth noting that there is an inherent difficulty in distinguishing between vowels and semi-vowels. Sometimes, two words are written the same, but they are pronounced with or without a semi-vowel, thus completely changing their meaning, e.g., $\delta\acute{\omicron}\text{-}\lambda\iota\alpha$ (the adjective *devious* in feminine singular) and $\delta\acute{\omicron}\text{-}\lambda\iota\text{-}\alpha$ (the adverb *deviously*). Distinguishing between a semi-vowel and a true vowel is very difficult and requires textual analysis [14]. For the purpose of \TeX , all such suspicious semi-vowel combinations are treated as semi-vowels. The end result is that the word $\alpha\pi\acute{\omicron}\eta\chi\omicron\varsigma$ will be hyphenated as $\alpha\text{-}\pi\acute{\omicron}\eta\text{-}\chi\omicron\varsigma$. But it is better seeing some words hyphenated with one less syllable, than seeing extra syllables in other words, e.g., $\beta\acute{\omicron}\eta\text{-}\theta\alpha$ $\Pi\alpha\text{-}\nu\alpha\text{-}\gamma\iota\text{-}\acute{\alpha}$! (Apparently, Liang took the same approach, disallowing some valid hyphenations for the sake of forbidding definitely invalid ones [15].)

4. *Single or double consonants at the end or the beginning of a word do not constitute separate syllables.* The corresponding patterns are $\mathbf{4b}$. $\mathbf{4g}$ $\mathbf{4y}$., $\mathbf{.b4}$ $\mathbf{.g4}$... $\mathbf{.y4}$. To these patterns, one must add some other ones for the case of elision: $\mathbf{4b''}$ $\mathbf{4g''}$... $\mathbf{4y''}$.

5. *Double consonants are hyphenated.* The patterns for this rule are: $\mathbf{4b1b}$ $\mathbf{4g1g}$... $\mathbf{4q1q}$ $\mathbf{4y1y}$.

6. *Consonant combinations that cannot be found at the beginning of Greek words must be split after the first consonant* The patterns are: $\mathbf{4b1z}$ $\mathbf{4b1j}$... $\mathbf{4y1f}$ $\mathbf{4y1q}$. No distinction is made between nasal and non-nasal $\mu\pi$ (mb/b), $\nu\tau$ (nd/d) and $\gamma\chi$ (ng/g); these consonant combinations are not to be split. However, some other patterns are inserted to deal with some thorny combinations of three or more consonants:

$\mathbf{4r5g2m}$	$\acute{\epsilon}\rho\text{-}\gamma\mu\alpha$ (Anc. Gr.)
$\mathbf{tz2m}$	$\mu\acute{\alpha}\nu\alpha\text{-}\tau\zeta\mu\epsilon\nu\tau$
$\mathbf{4r5j2m}$	$\pi\omicron\rho\text{-}\theta\mu\acute{\omicron}\varsigma$
...	
$\mathbf{4m5y2t}$	$\lambda\acute{\alpha}\mu\text{-}\psi\tau\epsilon$
$\mathbf{4g1kt}$	$\epsilon\lambda\epsilon\gamma\text{-}\kappa\tau\eta\varsigma$
$\mathbf{4n1tz}$	$\nu\epsilon\rho\alpha\nu\text{-}\tau\zeta\iota\acute{\alpha}$
$\mathbf{4n1ts}$	$\beta\iota\omicron\lambda\omicron\nu\text{-}\tau\sigma\acute{\epsilon}\lambda\omicron$

More patterns could have been inserted here to deal with non-Greek proper names with sequences of three or more consonants transliterated into Greek. For example, the pattern $\mathbf{4r5l2s}$ could have been added to hyphenate the transliterated name *Carlson* as $\text{K}\acute{\alpha}\rho\text{-}\lambda\sigma\omicron\nu$ and not as $\text{K}\acute{\alpha}\rho\lambda\text{-}\sigma\omicron\nu$ (the latter is not allowed according to Greek grammar rules). However, the number of such words is infinite and the effort most likely worthless.

7. *Two or more consonants at the end of a word do not constitute separate syllables.* Such endings are mostly found in Ancient Greek words, or words of non-Greek origin which have become part of the Modern Greek vocabulary: $\mathbf{4k1}$. ($\pi\iota\text{-}\nu\acute{\alpha}\chi\lambda$) ... $\mathbf{4nc}$. ($\acute{\epsilon}\lambda\text{-}\mu\iota\nu\varsigma$, Anc. Gr.) ... Such words can be found easily in reverse dictionaries of Modern Greek [16].

8. *Combinations of double consonants are separated.* These are some rare combinations of non-nasal $\mu\pi$ with $\nu\tau$ and/or $\gamma\chi$ in words of non-Greek origin which are now part of the Modern Greek vocabulary, e.g., $\mathbf{4mp1nt}$ ($\rho\omicron\mu\pi\text{-}\nu\tau\epsilon\sigma\acute{\alpha}\mu\pi\rho$ = *robe-de-chambre*).

2.1.2 Polytonic Texts

The hyphenation rules that apply to monotonic Modern Greek texts apply also to polytonic Modern Greek texts. Of course, the patterns for polytonic Modern Greek had to be expanded to include all possible combinations of vowel and diacritic (breathing, accent and/or iota subscript).

As mentioned above, polytonic Modern Greek has another notable difference in hyphenation: The nasal $\mu\pi$, $\nu\tau$ and $\gamma\chi$, which are pronounced as mb , nd and ng respectively, are to be separated. On the

contrary the non-nasal $\mu\pi$, $\nu\tau$ and $\gamma\chi$, which are pronounced as b , d and g , must not be separated. In general, $\mu\pi$, $\nu\tau$ and $\gamma\chi$ are nasal, thus the patterns: $4m1p$, $4n1t$, and $4g1k$. These consonant combinations are non-nasal when they follow another consonant: $\tilde{\alpha}\lambda$ - $\mu\pi\omicron\upsilon$ - $\rho\omicron$, $\sigma\epsilon\beta$ - $\nu\tau\acute{\alpha}\varsigma$, $\acute{\alpha}\rho$ - $\gamma\chi\acute{\omicron}$, etc., or in words of non-Greek origin: Υ - $\mu\pi\rho\acute{\alpha}\eta\mu$, $\mu\pi$ - $\nu\tau\acute{\epsilon}\varsigma$, etc.

For the creation of hyphenation patterns, the non-nasals $\mu\pi$, $\nu\tau$ and $\gamma\chi$ can be treated in the same way Haralambous treated Ancient Greek compound words [5]. Hence, with the help of Andriotis' etymological dictionary [17], a list of *exceptions* was built such as:

.giou5g2k	Γιου-γχοσλάβος
5g2krant.	Βόλγχο-γκραντ
...	
.qa5n2to	χα-ντούμης
.qa5n2tr	χα-ντρῶν
.q'a5n2tr	χά-ντρα

The list of all these exceptions is quite lengthy and covers five printed pages of *Eutypon* [6].

2.2 Patterns for Ancient Greek

The grammatical rules for hyphenation of Ancient Greek are mostly the same as those for polytonic Modern Greek. Apparently, the Ancient Greeks hyphenated following the simple rule that a single consonant between two vowels in one word belongs with the second vowel: $\sigma\omicron$ - $\phi\acute{\iota}$ - $\zeta\omega$, $\kappa\alpha$ - $\theta\acute{\alpha}$ - $\pi\epsilon\rho$. The Ancient Greeks also considered non-accented words as being part of the following word [18]. For example, the Ancients would hyphenate $\acute{\epsilon}\chi$ $\tau\acute{\omicron}\upsilon\tau\omicron\upsilon$ as $\acute{\epsilon}$ - $\chi\tau\acute{\omicron}\upsilon$ - $\tau\omicron\upsilon$. Nonetheless, rules introduced by later scholars do not allow for such extravagant hyphenations.

A very tricky rule introduced by modern scholars states that “[Ancient Greek] compound words divide at the point of union” [18]. This rule has been extended to *katharevousa* and some typographers are still using it for polytonic Modern Greek (most likely mistakenly). That rule also appears in two variations. In one variation, which has been adopted by *The Chicago Manual of Style* [19], compound words are divided into their original parts irrespective of whether those original parts have been modified or not. Therefore, one should hyphenate $\sigma\tau\rho\alpha\tau$ - $\eta\eta\acute{\omicron}\varsigma$ ($\sigma\tau\rho\alpha\tau\acute{\omicron}\nu$ + $\tilde{\alpha}\gamma\omega$), $\Delta\acute{\iota}\omicron\sigma$ - $\kappa\omicron\upsilon\rho\omicron\varsigma$ ($\Delta\acute{\iota}\omicron\varsigma$ + $\kappa\omicron\upsilon\acute{\rho}\omicron\varsigma$), etc. This is the rule followed by Haralambous for the creation of Ancient Greek hyphenation patterns for the commercial package ScholarTeX [5]. In another variation, adopted by some 19th-century scholars [20] and the Academy of Athens [21], compound words are divided into their original constituent words *only* when the first word has not lost its last vowels by elision. According to that rule varia-

tion, the word $\sigma\tau\rho\alpha\tau\eta\eta\acute{\omicron}\varsigma$ should be hyphenated as $\sigma\tau\rho\alpha$ - $\tau\eta\eta\acute{\omicron}\varsigma$, because the first word ($\sigma\tau\rho\alpha\tau\acute{\omicron}\nu$) has lost its final $\omicron\nu$.

For the creation of hyphenation patterns for Ancient Greek, the author chose to follow the rule adopted by the Academy of Athens, because this rule has also been adopted in the manuals used in the Greek high schools and lycées [11]. Thus, with the help of two widely-used dictionaries [22, 23], a list of *exceptions* for compound words was incorporated into the list of patterns for Ancient Greek:

>adi'e2x1	$\acute{\alpha}\delta\acute{\iota}\acute{\epsilon}\xi$ - $\omicron\delta\omicron\varsigma$
>adie2x1	$\acute{\alpha}\delta\acute{\iota}\acute{\epsilon}\xi$ - $\acute{\omicron}\delta\omicron\upsilon$
>adu2s1'w	$\acute{\alpha}\delta\upsilon\sigma$ - $\acute{\omicron}\pi\eta\tau\omicron\varsigma$
>adu2s1w	$\acute{\alpha}\delta\upsilon\sigma$ - $\acute{\omicron}\pi\acute{\eta}\tau\omicron\upsilon$
...	
i2s1qili'akic.	$\delta\acute{\iota}\sigma$ - $\chi\acute{\iota}\lambda\acute{\iota}\acute{\alpha}\kappa\acute{\iota}\varsigma$, etc.
i2s1muri'akic.	$\delta\acute{\iota}\sigma$ - $\mu\upsilon\rho\acute{\iota}\acute{\alpha}\kappa\acute{\iota}\varsigma$, etc.

This list is quite extensive; it includes 1555 patterns and covers twenty-eight printed pages [24].

It is worth mentioning here that special care has been taken not to confuse Ancient and Modern Greek exceptions for the division of consonants. For example, there are no Ancient Greek words that start with the Modern Greek double consonants $\mu\pi$, $\nu\tau$, $\gamma\chi$, $\tau\zeta$ and $\tau\sigma$. Therefore, all these combinations are divided in Ancient Greek texts, with no exception. Also, combinations of stopped consonants (π , β , φ / τ , δ , θ / χ , γ , χ) and the nasals μ or ν are not divided [20].

3 Putting the Patterns to Work

The patterns have been archived in three files, which have already found their way onto CTAN [24]:

- GRMhyph?.tex for monotonic Modern Greek,
- GRPhyph?.tex for polytonic Modern Greek, and
- GRAhyph?.tex for Ancient Greek.

(The ? is a number indicating the current version.)

The first two patterns for Modern Greek were tested on a sample text created by the author, after building a new **plain** format [6]. (Incidentally, **plain** is just an extension of Knuth's **plain** format for the use of several languages with **babel**.) The result showed considerable improvement in comparison to hyphenation results obtained by earlier set of patterns (Table 1). With another **plain** format, the hyphenation patterns for Ancient Greek were tested on five classic texts in their original:

- Herodotus, *The Histories* A, I–III;
- Xenophon, *Anabasis* A, 1.IV.11–13;
- Plutarch, *Lives* Themistocles, II.1–5;
- Strabo, *Geography*, 7.1.1–5; and

Patterns	Mistakes (%)	Misses (%)
<code>rgrhyph.tex</code> [1]	25	13
<code>grhyph.tex</code> [4]	3	16
<code>GRPhyph.tex</code> (this work)	–	3

Table 1: Results from hyphenation tests with three different sets (files) of hyphenation patterns available in the public domain. Mistakes represent erroneous hyphenations. Misses represent missed hyphenation points.

- Lysias, *Defence against a Charge for Taking Bribes*.

Surprisingly, \TeX correctly hyphenated *all* Ancient Greek words found in these texts, which cover about seven printed pages [7, 24].

The author, however, does not believe that his patterns are error-free. The Ancient Greek adjective $\pi\rho\sigma\kappa\omicron\pi\eta$ has two different etymologies and meanings: “looking out for” hyphenated as $\pi\rho\sigma\kappa\omicron\pi\eta$ ($\pi\rho\delta + \sigma\kappa\omicron\pi\acute{\epsilon}\omega$), or “an offence” hyphenated as $\pi\rho\sigma\kappa\omicron\pi\eta$ ($\pi\rho\delta\varsigma + \chi\acute{o}\pi\omicron\varsigma$). Unfortunately, \TeX does not do textual analysis and will not understand the difference. Syllables with vowel synizesis may be erroneously split apart, e.g., $\chi\rho\upsilon\sigma\acute{\epsilon}\omega$ instead of $\chi\rho\upsilon\sigma\acute{\epsilon}\omega$. Again, \TeX does not do textual analysis and it is impossible for a typesetting system to capture such small details. Finally, the use of the same patterns for typesetting a mixed Ancient and Modern Greek text will bring a few surprises. For the purpose of \TeX , Ancient and Modern Greek are better treated as two different `\languages`.

4 Creation of Patterns for `ibycus` and Ω

The patterns created by the author have already been picked up by other people who are working on other packages or systems that use different font encodings. Using a Perl script, Apostolos Syropoulos adapted the hyphenation patterns for monotonic Modern Greek and Ancient Greek for usage with Ω [25]. Using another Perl script, Peter Heslin [26] adapted the hyphenation patterns for Ancient Greek for the `ibycus` package, which can be used for typesetting texts obtained from the *Thesaurus Linguae Graecae*.

5 Conclusions

The hyphenation patterns created by the author for Ancient and Modern Greek are indeed superior to those previously found on CTAN. Nonetheless, the patterns are presently under revision to eliminate a few minor mistakes. The author anticipates that

the improved patterns will be released in CTAN very soon—probably before the TUG 2004 conference. Hopefully, these patterns will shortly after migrate into `ibycus` and Ω , and they will become the default Greek hyphenation patterns in whatever system/package becomes the successor of \TeX .

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