Rumi Numeral System Symbols,
Additional characters proposed to Unicode

Azzeddine LAZREK
lazrek@ucam.ac.ma
Cadi Ayyad University, Faculty of Sciences
P.O. Box 2390, Marrakech, Morocco
Phone: +212 24 43 46 49 Fax: +212 24 43 74 09
URL: http://www.ucam.ac.ma/fssm/rydarab

August 5, 2006

1 Introduction

A special numeral system rumi\textsuperscript{1} has been in use in North Africa since the X\textsuperscript{e} century. It remained in use until the XVII\textsuperscript{e} century. This system has been especially used in the administration of the city of Fez in Morocco. It has also been used in Al-Andalusians, Spain, starting from the XII\textsuperscript{e} century. The forms of the digits are quiet different from the Arabic\textsuperscript{2} or the Arabic-Indic\textsuperscript{2} digits in use today.

"The rumi numeral system originates in the Coptic or at least the Greek-Coptic tradition. The exact date when it was viewed as a system unto itself — that is, not a Coptic or Graeco-Coptic borrowing — has not yet been determined. rumi is used in foliation, chapters, and quire notations in a variety of manuscripts (including religious, scientific, accounting, and mathematical works) and on astronomical instruments. As such, encoding rumi will be very helpful for researchers in the history of mathematics, astronomy, and science in general, particularly as it was used for several hundred years."

The system of numeration wasn’t really neither decimal nor positional. rumi use some special symbols (see Table 1, Table 2, Table 3 and Table 4). Some examples are available (see Table 5, Table 6 and Table 7). This system

\textsuperscript{1}using TransTeX Transliteration
\textsuperscript{2}the identifier name used by The Unicode Consortium http://www.unicode.org

1
is also known as *zimam letters*, *Roman* or *Fez letters* (namely Hrwf al-zmAm, al-rwmy or Hrwf fAs (حرف الزمام، الرمومي أو حروف فلس) or also *rsm al-zmam*, al-qhm al-rwmy or al-qhm al-fAsy (رقم الزمام، القلم الرومي أو القلم الفاسي)).

2 Description

Rumi numeral system has been described by many researchers and there is many studies about it [7], [8], [9], [10], [11], [12], [1] and others in [2]. We have adopted the one described by the mathematician Ibn Al-Banna (1256-1321, Marrakech) in his famous book [7] "Abstract of using rumi in calculus" or "Shortening from the work in the rumi in the account" in Arabic (namely Al-aqtDAb mn al-Enl b-al-rwmi f al-HsAb (الابحاث من عمل بالرومي في الأعداد)).

Rumi use some special symbols for digits:

- **rumi ones** are (see Table 1):

- **rumi tens** are (see Table 2):

- **rumi hundreds** are (see Table 3):

Multiples of thousand are represented by adding bars under the based number:

- **rumi thousands** are noted by one bar under the number (see Table 5) (ex., for three thousands);

- **rumi million** are noted by two bars under the number (see Table 6) (ex., for three million);

- and so on.

Fraction is represented by adding a slash symbol separating the numerator from the denominator:

- the most used rumi fractions: 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9 and 9/10 are noted by (see Table 7):

and respectively;
• the special fractions: 1/2, 1/4, 1/3 and 2/3 are also noted by (see Table 4): ½, ¼, ⅓ and ⅔ respectively.

Generally, there is a generative principle for fractions, similar to building western ones. Notice that the numerator is in the top right and the denominator is in the bottom left, perhaps according to the Arabic writing direction. The numerator and the denominator are separated by almost an horizontal slash without spacing. For example, in rumi system, the fraction 253/500 is represented by ٢٥٣٥٠٠. We could were wondering if this position of numerator and denominator are respected in the other writing with left-to-right direction what was adopted? However, according the Ibn Al-Banna manuscript (boat Rabat’s and Marrakech’s), the only four fractions: 1/2, 1/4, 1/3 and 2/3 have either there building symbols or special symbols pre-composed. We could were wondering if the "special fractions" are used much elsewhere?

3 Proposition

The rumi numeral system symbols are proposed to be included in Unicode Standard.

There names are described in rumi ones digits (see Table 8), rumi tens digits (see Table 9), rumi hundreds digits (see Table 10) and rumi special fractions (see Table 11).

There glyphs are taking from the Rabat copy of Ibn al-Banna manuscript [7]. The rumi glyphs used during its using can’t be identical in all manuscripts. Through some available manuscripts, there are some small differences between them. We think that is natural as there are writing by hand from different writers in many environments. We can’t recherche to establishing the canonical pattern of the Rumi figures but only a representative glyph since is what is contained in the Unicode charts. A study is made the have a comparative rumi glyphs scanned from some manuscripts (see Figure 13 such that colones from [7], [8], [9], [10], [11], [11] and [12] respectively) and (see Figure 14).

As many manuscripts in studying use these symbols, we need to encode them. We are working on studying and translating to English the Ibn Al-Banna manuscript. A computer system for transforming numbers from and to rumi numeral system is also in development.

A detailed bibliography and some used examples are presented in the end.

The rumi and AntiSym fonts available, includes all these characters. In rumi font, used here, the shapes of the reference glyphs are scanned.
from [7]. It's in OpenType format [3] and converted in METAFONT as a \LaTeX{} package [5]. In Antisym font, glyphs are drawn by hand in METAFONT as a \LaTeX{} package [4].

The shapes of the reference glyphs used are not frozen. They are continually being improved in \textit{Multilingual scientific e-document processing} Project at Al-khawarizmi Atelier.

Some boxes are add to some symbols in Figures in order to emphasis them and understand the purpose of the samples.

More information about this presentation is available in [6].

References


[7] Ibn Al-Banna (1256-1321, Marrakech), Shortening from the work in the rumi in the account, Manuscript in the national library in Rabat. It was copied after the death of Ibn Al-Banna, without noting the writer name. In the end, it notes the date of the end of the manuscript writing is Friday 3/10/908 hijer witch will be 31/3/1503.

[8] Ibn Al-Banna (1256-1321, Marrakech), Shortening from the work in the rumi in the account, Manuscript in the Ibn Youssef library in Marrakesh. It was copied after the death of Ibn Al-Banna, without noting neither the name nor the date to copy it.
[9] Abderrahman Ibn Mohammed Al-Fasi known by Ibn Al-Arabi, Design of Zimam, Manuscript in the Ibn Youssef library in Marrakesh. It was copied after the death of Ibn Al-Arabi, without noting neither the name nor the date to copy it.

[10] Narrow faces in the account and Zimam, Manuscript in the Ibn Youssef library in Marrakesh. Manuscript without noting neither the author name nor the date to copy it.

[11] Ahmed Ibn Al-Ayashi Skyrj, Direction of learning and that which forgot the form and the characteristics of the Al-Fasi style, Edition of Fez, 1316h. Skyrj said that Fasi system is used by Fasi people (Moroccan town Fez) and came from the old Rumi system. He presents the two systems. He presents a table of the nine unite fractions (the unite symbol with a tail sign without knowing which one!).

Table 1: Rumi ones symbols

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 2: Rumi tens symbols

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Rumi hundreds symbols

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>900</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Rumi special fractions symbols

<table>
<thead>
<tr>
<th>1/2</th>
<th>1/4</th>
<th>1/3</th>
<th>2/3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Rumi thousands examples

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>5000</td>
<td>6000</td>
<td>7000</td>
<td>8000</td>
<td>9000</td>
<td>10000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100000</td>
<td>200000</td>
<td>300000</td>
<td>400000</td>
<td>500000</td>
<td>600000</td>
<td>700000</td>
<td>800000</td>
<td>900000</td>
<td>1000000</td>
</tr>
</tbody>
</table>
Table 6: Rumi millions examples

<table>
<thead>
<tr>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
<th>Rumi Digit</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Two</td>
<td>Three</td>
<td>Four</td>
<td>Five</td>
<td>Six</td>
<td>Seven</td>
<td>Eight</td>
<td>Nine</td>
<td>One</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 7: Rumi fractions examples

<table>
<thead>
<tr>
<th>1/2</th>
<th>2/3</th>
<th>3/4</th>
<th>4/5</th>
<th>5/6</th>
<th>6/7</th>
<th>7/8</th>
<th>8/9</th>
<th>9/10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RUMI DIGIT ONE
≈ 0031 1 digit one
≈ 0661 \ Arabic-Indic digit one

RUMI DIGIT TWO
≈ 0032 2 digit two
≈ 0662 \ Arabic-Indic digit two

RUMI DIGIT THREE
≈ 0033 3 digit three
≈ 0663 \ Arabic-Indic digit three

RUMI DIGIT FOUR
≈ 0034 4 digit four
≈ 0664 \ Arabic-Indic digit four

RUMI DIGIT FIVE
≈ 0035 5 digit five
≈ 0665 \ Arabic-Indic digit five

RUMI DIGIT SIX
≈ 0036 6 digit six
≈ 0666 \ Arabic-Indic digit six

RUMI DIGIT SEVEN
≈ 0037 7 digit seven
≈ 0667 \ Arabic-Indic digit seven

RUMI DIGIT EIGHT
≈ 0038 8 digit eight
≈ 0668 \ Arabic-Indic digit eight

RUMI DIGIT NINE
≈ 0039 9 digit nine
≈ 0669 \ Arabic-Indic digit nine

Table 8: Rumi ones digits
RUMI DIGIT TEN
• used as a symbol with a numeric value of 10
RUMI DIGIT TWENTY
• used as a symbol with a numeric value of 20
RUMI DIGIT THIRTY
• used as a symbol with a numeric value of 30
RUMI DIGIT FORTY
• used as a symbol with a numeric value of 40
RUMI DIGIT FIFTY
• used as a symbol with a numeric value of 50
RUMI DIGIT SIXTY
• used as a symbol with a numeric value of 60
RUMI DIGIT SEVENTY
• used as a symbol with a numeric value of 70
RUMI DIGIT EIGHTY
• used as a symbol with a numeric value of 80
RUMI DIGIT NINETY
• used as a symbol with a numeric value of 90

Table 9: rumi tens digits

RUMI DIGIT HUNDRED
• used as a symbol with a numeric value of 100
RUMI DIGIT TWO HUNDRED
• used as a symbol with a numeric value of 200
RUMI DIGIT TREE HUNDRED
• used as a symbol with a numeric value of 300
RUMI DIGIT FOUR HUNDRED
• used as a symbol with a numeric value of 400
RUMI DIGIT FIVE HUNDRED
• used as a symbol with a numeric value of 500
RUMI DIGIT SIX HUNDRED
• used as a symbol with a numeric value of 600
RUMI DIGIT SEVEN HUNDRED
• used as a symbol with a numeric value of 700
RUMI DIGIT EIGHT HUNDRED
• used as a symbol with a numeric value of 800
RUMI DIGIT NINE HUNDRED
• used as a symbol with a numeric value of 900

Table 10: rumi hundreds digits
RUMI FRACTION ONE HALF
- used as an other symbol with a numeric value of 1/2
≈ 00BD 1/2 vulgar fraction one half

RUMI FRACTION ONE QUARTER
- used as a symbol with a numeric value of 1/4
≈ 00BC 1/4 vulgar fraction one quarter

RUMI FRACTION ONE THIRD
- used as a symbol with a numeric value of 1/3
≈ 2153 1/3 vulgar fraction one third

RUMI FRACTION TWO THIRDS
- used as an other symbol with a numeric value of 2/3
≈ 2154 2/3 vulgar fraction two thirds

Table 11: rumi special fractions
Figure 1: rumi numeral system in [7] page 1
Figure 2: rumi numeral system in [7] page 1 printed
In the name of The God, the most Merciful, the most Compassionate

The God prayed on Mohammed reign and on his family and accompanied him and peace of delivery

The shortening from the work in the Rwny in the calculation, formation of the participant virtuous of the magnificent jurist generous associated complete Abou Albas Ahmed Ben Mohammed Ben Othman al’Andy. He was introduced as mason’s son numerical Alhuzaastry. The God sanctified went him and his utens in his blessing and his casual dress and lengthens him.

The God praised neither his break-off for ace nor his end for border and the prayer on Mohammed is discerning and worshipped him and on his family and his peace and honor a lot. After, so this shortening from the work in the Rwny in the account on towards what choice of the heads from the laborers fell, and from The God asks the good success.

Chapter in names ranks of the numbers and prescription glyphs in Rwny.

Knows that the rank first is the ones nine and the second is the tens nine and the third is the hundreds nine and the fourth is the thousands nine and the fifth is the tens of thousands nine and the sixth is the hundreds of thousands nine and the seventh is the thousands hundreds nine and so on until the infinite one.

For each number of the first three numbers ranks a sign which distinguishes it, the first is one and the last is nine hundred. The draws of thousands and its tens and its hundreds are the same as the draws of ones and tens and hundreds and the difference between them is the repetition. The form of the repetition is a bar under the number and these images for all them:

Likewise thousands of thousands and its tens and its hundreds return to glyphs before them and the difference between them the repetition. For each kind what be necessary for him likewise so on until the infinite one.

When the fractions are to be drawn, we write the base number which derives the fraction and draws above him a line called chair and writes above him the parts which derives from him, and as the fraction’s fraction. Here are examples of draw: one half $\frac{1}{2}$, two thirds $\frac{2}{3}$, tree quarters $\frac{3}{4}$, four fifths $\frac{4}{5}$, five sixths $\frac{5}{6}$, six sevenths $\frac{6}{7}$, seven eighths $\frac{7}{8}$, eight ninths $\frac{8}{9}$, nine tenths $\frac{9}{10}$. And leads the man working in make up provided that draw the one half in this way $\frac{1}{2}$, and one quarter in this way $\frac{1}{4}$ and one third in this way $\frac{1}{3}$ and the two third in this way $\frac{2}{3}$. They don’t use fractions which these based are more than ten. If they arrive to have some of them they transform them to what you will know in the addition chapter after this one.

The fractions they used stubborn two kinds added and different. So for added fraction, the fraction whose based is great advances and the little about right and little low from him, example five eight and three eighth and third eighth in this way $\frac{5}{8} + \frac{3}{8} + \frac{1}{8}$. As for different fraction, parts are under others parts example five eighth and six sevenths in this way $\frac{5}{8} \neq \frac{6}{7}$.

Figure 3: rumi numeral system in [7] page 1 translated in English
Figure 4: Integer rumi symbols in [7]

Figure 5: Fraction rumi symbols in [7]

Figure 6: Rumi numbers from Skyrj rumi in [11]

Figure 7: Rumi numbers from Skyrj Fasi in [11]
Figure 8: Nine unite rumi fractions from Skyrj Fasi [11]
Figure 9: Uses example taking from [12]
parum dirutus, necesse fuit abscedere folia quæ inutilia esse
ratis; hæc suspicio confirmatur ex factò, quod folia octogesimo
posteròvr morsùs vermiùm majorès habènt præcipue circa fo-
lium centésimum tertium; et notandum est hos morsùs jam
in codice existentès esse cum collatio, saltem secunda fictìa,
nam quidam restaurati suerè, ut videtur ab antiquo et verba
a verribus plène corrosa in margine explicantur: charta anti-
quioris codicis major erat, nam à folio trigésimo nono usque
ad centésimum quintum vestigia antiquioris foliorum nume-
rationis existunt; nam numeratio ex magna parte abscissìa fuit:
in foliis secundæ partis nihil hujusce modi numerationis distin-
guitur, et brevès notæ marginales, præcipue verbum præmii
pluries in margine primæ partis scriptum fere evanuit.

Specimen numerationis foliorum in codice Escorialensi.

Foliorum numeratio. Codex habet foliorum numerationem
modernam, factam postquam codex a librario numerationis arâ-
biceo imperito compactus est; a folio enim secundo transilire
necessè fuit ad folium decimum septimum et a folio vigesimo
secundo iterum ad tertium recessìre.

Ex foliorum numeratione antiqua codex centum sexaginta
Figure 11: Uses example taking from [12]
Figure 12: Uses example taking from [12]
<table>
<thead>
<tr>
<th>№</th>
<th>Ibn Al-Banna Rabat</th>
<th>Ibn Al-Banna Marrakech</th>
<th>Ibn Al-Arabi</th>
<th>Zinam</th>
<th>Skryj Rumi</th>
<th>Skryj Fasi</th>
<th>Ibn Pushkwal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 13: Comparised of some uses rumi system
<table>
<thead>
<tr>
<th>N.</th>
<th>Greek 5th c. 8b</th>
<th>Coptic Egypt, 5th c. 44</th>
<th>R.II.18 Al-Andalus, 9th c. 36</th>
<th>MDU-604 Al-Andalus, 10th c. 24</th>
<th>Coptic Egypt 11th c. 36</th>
<th>Toledo 12th-13th c. 2m</th>
<th>Valencia 14th-16th c. 3m</th>
<th>Maghrib 16th c. 1n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>α</td>
<td>α</td>
<td>α</td>
<td>α</td>
<td>α</td>
<td>Ψ</td>
<td>Ψ</td>
<td>Ψ</td>
</tr>
<tr>
<td>2</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
</tr>
<tr>
<td>3</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
<td>γ</td>
</tr>
<tr>
<td>4</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
<td>δ</td>
</tr>
<tr>
<td>5</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>6</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
<td>θ</td>
</tr>
<tr>
<td>7</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
<td>χ</td>
</tr>
<tr>
<td>8</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
<td>ζ</td>
</tr>
<tr>
<td>9</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>10</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
<td>ι</td>
</tr>
<tr>
<td>20</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>30</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>40</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>50</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>60</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>70</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>80</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>90</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
<tr>
<td>100</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
<td>η</td>
</tr>
</tbody>
</table>

8b Examples of Greek and Greek derived alphanumerical notations from the 5th to the 16th centuries.
8c J. A. Sánchez Pérez. [1935: 104].
8d Labarta - Barceló [1988: 22-24, table V]. The example of Valencia, from the early 13th century, serves as a bridge between the rumi figures of the late 12th-early 13th century in Toledo and those of the 16th century in Morocco.
8f Bartina [1968: 99-110].
8h Hassizka [1990: 285-287, pl. 131].
8i Van Groningen [1963: 34, fig. 5], minuscule cursive script found in Greek manuscripts dated in the 8th and the 9th century.
8j Cf. note 4.
8k Cf. note 5.