

# ISO/IEC JTC 1/SC 2/WG 2 N3087

## PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646<sup>1</sup>

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

See also <http://www.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest Roadmaps.

### A. Administrative

1. Title:	Rumi Numeral System Symbols
2. Requester's name:	Azzeddine LAZREK
3. Requester type (Member body/Liaison/Individual contribution):	Member body Cadi Ayyad University Marrakech-Morocco
4. Submission date:	2006-03-30
5. Requester's reference (if applicable):	lazrek@ucam.ac.ma
6. Choose one of the following: This is a complete proposal:	<input checked="" type="checkbox"/> <a href="http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/amosl.pdf">http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/amosl.pdf</a>
(or) More information will be provided later:	<input type="checkbox"/>

### B. Technical – General

1. Choose one of the following: a. This proposal is for a new script (set of characters): Proposed name of script:	
b. The proposal is for addition of character(s) to an existing block: Name of the existing block:	addition of characters to existing blocks
2. Number of characters in proposal:	31
3. Proposed category (select one from below - see section 2.2 of P&P document): A-Contemporary <input type="checkbox"/> B.1-Specialized (small collection) <input checked="" type="checkbox"/> B.2-Specialized (large collection) <input type="checkbox"/> C-Major extinct <input type="checkbox"/> D-Attested extinct <input type="checkbox"/> E-Minor extinct <input type="checkbox"/> F-Archaic Hieroglyphic or Ideographic <input type="checkbox"/> G-Obscure or questionable usage symbols <input type="checkbox"/>	
4. Proposed Level of Implementation (1, 2 or 3) (see Annex K in P&P document): Is a rationale provided for the choice? If Yes, reference:	1 Yes
5. Is a repertoire including character names provided? a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? b. Are the character shapes attached in a legible form suitable for review?	Yes Yes Yes
6. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard? If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:	True Type and LaTeX package <a href="http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/rumi.ttf">http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/rumi.ttf</a> <a href="http://www.ucam.ac.ma/fssm/rydarab/system/zip/rumi.zip">http://www.ucam.ac.ma/fssm/rydarab/system/zip/rumi.zip</a>
7. References: a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?	Yes Yes
8. Special encoding issues: Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?	Yes

### 9. Additional Information:

Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see <http://www.unicode.org/Public/UNIDATA/UCD.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

<sup>1</sup> Form number: N3002-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10)



### C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? If YES explain	No
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? If YES, with whom? If YES, available relevant documents:	Yes
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? Reference:	About 100 million of people Arabic scripts
4. The context of use for the proposed characters (type of use; common or rare) Reference:	rare
5. Are the proposed characters in current use by the user community? If YES, where? Reference:	No
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? If YES, is a rationale provided? If YES, reference:	No
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?	Yes
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? If YES, is a rationale for its inclusion provided? If YES, reference:	No
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? If YES, is a rationale for its inclusion provided? If YES, reference:	No
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? If YES, is a rationale for its inclusion provided? If YES, reference:	No
11. Does the proposal include use of combining characters and/or use of composite sequences? If YES, is a rationale for such use provided? If YES, reference: Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? If YES, reference:	No
12. Does the proposal contain characters with any special properties such as control function or similar semantics? If YES, describe in detail (include attachment if necessary)	No
13. Does the proposal contain any Ideographic compatibility character(s)? If YES, is the equivalent corresponding unified ideographic character(s) identified? If YES, reference:	No

# Rumi Numeral System Symbols,

Additional characters proposed to Unicode

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## 1 Introduction

A special numeral system *rumi*<sup>1</sup> has been in use in North Africa since the X<sup>e</sup> century. It remained in use until the XVII<sup>e</sup> 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<sup>e</sup> century. The forms of the digits are quite different from the Arabic<sup>2</sup> or the Arabic-Indic<sup>2</sup> digits in use today. The system of numeration was decimal, but not really 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 is also known as "zimam letters, Roman, Fez letters" (namely Hrwf al-zmAm, al-rumi, Hrwf fAs or also rasm al-zmam, Qalam al-rumi, Qalam al-fAsy).

## 2 Description

*rumi* numeral system has been described by many researchers and there is many studies about it. A detailed bibliography is presented in Figure 1 (see some figures from this bibliography in the end). We have adopted the one

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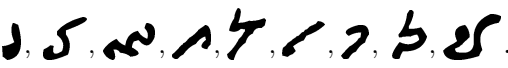


<sup>1</sup>using Transtec Transliteration

<http://www.ucam.ac.ma/fssm/rydarab/doc/communic/transtec.pdf>



<sup>2</sup>the identifier name used by The Unicode Consortium <http://www.unicode.org>

described by the mathematician Ibn Al-Banna (1256-1321, Marrakech) in his famous book [1] "Abstract of using rumi in calculus" in Arabic (namely Al-YqtDAb mn al-Eml b-al-rwmI fl al-HsAb).



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 a slash 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:

- rumi fractions are generally noted by (see Table 7): 
- Some special fractions are also noted by (see Table 4): 

### 3 proposition

These symbols are proposed to be included in Unicode Standard. There names are descriped in rumi ones digits (see Table 8), rumi tens digits (see Table 9) rumi handreds digits (see Table 10) and rumi specila fractions (see Table 11).

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 Al-YqtDAb mn al-Eml b-al-rwmI fl al-HsAb. A computer

system for transforming numbers from and to rumi numeral system is also in development.

The **rumi** and **AntiSym** fonts available, includes all these characters. In **rumi** font, used here, the shapes of the reference glyphs are scanned from [1]. It's in OpenType format [3] and converted in METAFONT as a  $\LaTeX$  package [4]. In **AntiSym** font, glyphs are drawing by hand in METAFONT as a  $\LaTeX$  package [2].

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

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

More information about this presentation is available in [5].

## References

- [1] Ibn Al-Banna (1256-1321, Marrakech), *Abstract of using rumi in calculus*, in Arabic.
- [2] Arabic mathematical old symbols package antisym for  $\LaTeX$ , <http://www.ucam.ac.ma/fssm/rydarab/system/zip/antisym.zip>.
- [3] rumi numeral system font in OpenType, <http://www.ucam.ac.ma/fssm/rydarab/doc/unicode/rumi.ttf>.
- [4] rumi numeral system as a package for  $\LaTeX$ , <http://www.ucam.ac.ma/fssm/rydarab/system/zip/rumi.zip>.
- [5] Azzeddine Lazrek, *Arabic mathematical symbols for Unicode*, <http://www.ucam.ac.ma/fssm/rydarab/english/unicode.htm>.

1	2	3	4	5	6	7	8	9
۱	۲	۳	۴	۵	۶	۷	۸	۹

Table 1: rumi ones symbols

10	20	30	40	50	60	70	80	90
۱۰	۲۰	۳۰	۴۰	۵۰	۶۰	۷۰	۸۰	۹۰

Table 2: rumi tens symbols

100	200	300	400	500	600	700	800	900
۱۰۰	۲۰۰	۳۰۰	۴۰۰	۵۰۰	۶۰۰	۷۰۰	۸۰۰	۹۰۰

Table 3: rumi hundreds symbols

1/2	1/4	1/3	2/3
۱/۲	۱/۴	۱/۳	۲/۳

Table 4: rumi special fractions symbols

1000	2000	3000	4000	5000	6000	7000	8000	9000
۱۰۰۰	۲۰۰۰	۳۰۰۰	۴۰۰۰	۵۰۰۰	۶۰۰۰	۷۰۰۰	۸۰۰۰	۹۰۰۰
10000	20000	30000	40000	50000	60000	70000	80000	90000
۱۰۰۰۰	۲۰۰۰۰	۳۰۰۰۰	۴۰۰۰۰	۵۰۰۰۰	۶۰۰۰۰	۷۰۰۰۰	۸۰۰۰۰	۹۰۰۰۰
100000	200000	300000	400000	500000	600000	700000	800000	900000
۱۰۰۰۰۰	۲۰۰۰۰۰	۳۰۰۰۰۰	۴۰۰۰۰۰	۵۰۰۰۰۰	۶۰۰۰۰۰	۷۰۰۰۰۰	۸۰۰۰۰۰	۹۰۰۰۰۰

Table 5: rumi thousands examples

1000000	2000000	3000000	4000000	5000000	6000000	7000000	8000000	9000000
10000000	20000000	30000000	40000000	50000000	60000000	70000000	80000000	90000000
100000000	200000000	300000000	400000000	500000000	600000000	700000000	800000000	900000000

Table 6: rumi millions examples

1/2	2/3	3/4	4/5	5/6	6/7	7/8	8/9	9/10

Table 7: rumi fractions examples

- RUMI DIGIT ONE  
 $\approx 0031$  1 digit one  
 $\approx 0661$  ١ Arabic-Indic digit one
- RUMI DIGIT TWO  
 $\approx 0032$  2 digit two  
 $\approx 0662$  ٢ Arabic-Indic digit two
- RUMI DIGIT THREE  
 $\approx 0033$  3 digit three  
 $\approx 0663$  ٣ Arabic-Indic digit three
- RUMI DIGIT four  
 $\approx 0034$  4 digit four  
 $\approx 0664$  ٤ Arabic-Indic digit four
- RUMI DIGIT FIVE  
 $\approx 0035$  5 digit five  
 $\approx 0665$  ٥ Arabic-Indic digit five
- RUMI DIGIT SIX  
 $\approx 0036$  6 digit six  
 $\approx 0666$  ٦ Arabic-Indic digit six
- RUMI DIGIT SEVEN  
 $\approx 0037$  7 digit seven  
 $\approx 0667$  ٧ Arabic-Indic digit seven
- RUMI DIGIT EIGHT  
 $\approx 0038$  8 digit eight  
 $\approx 0668$  ٨ Arabic-Indic digit eight
- RUMI DIGIT NINE  
 $\approx 0039$  9 digit nine  
 $\approx 0669$  ٩ Arabic-Indic digit nine

Table 8: RUMI ones digits



١٠	RUMI DIGIT TEN	• used as a symbol with a numeric value of 10
٢٠	RUMI DIGIT TWENTY	• used as a symbol with a numeric value of 20
٣٠	RUMI DIGIT THIRTY	• used as a symbol with a numeric value of 30
٤٠	RUMI DIGIT FORTY	• used as a symbol with a numeric value of 40
٥٠	RUMI DIGIT FIFTY	• used as a symbol with a numeric value of 50
٦٠	RUMI DIGIT SIXTY	• used as a symbol with a numeric value of 60
٧٠	RUMI DIGIT SEVENTY	• used as a symbol with a numeric value of 70
٨٠	RUMI DIGIT EIGHTY	• used as a symbol with a numeric value of 80
٩٠	RUMI DIGIT NINETY	• used as a symbol with a numeric value of 90
١٠٠	RUMI DIGIT HUNDRED	• used as a symbol with a numeric value of 100

Table 9: RUMI tens digits

٢٠٠	RUMI DIGIT TWO HUNDRED	• used as a symbol with a numeric value of 200
٣٠٠	RUMI DIGIT TREE HUNDRED	• used as a symbol with a numeric value of 300
٤٠٠	RUMI DIGIT FOUR HUNDRED	• used as a symbol with a numeric value of 400
٥٠٠	RUMI DIGIT FIVE HUNDRED	• used as a symbol with a numeric value of 500
٦٠٠	RUMI DIGIT SIX HUNDRED	• used as a symbol with a numeric value of 600
٧٠٠	RUMI DIGIT SEVEN HUNDRED	• used as a symbol with a numeric value of 700
٨٠٠	RUMI DIGIT EIGHT HUNDRED	• used as a symbol with a numeric value of 800
٩٠٠	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  $1/2$   
 $\approx$  00BD  $1/2$  vulgar fraction one half



RUMI FRACTION ONE QUARTER

- used as a symbol with a numeric value of  $1/4$   
 $\approx$  00BC  $1/4$  vulgar fraction one quarter



RUMI FRACTION ONE THIRD

- used as a symbol with a numeric value of  $1/3$   
 $\approx$  2153  $1/3$  vulgar fraction one third



RUMI FRACTION TWO THIRDS

- used as an other symbol with a numeric value of  $2/3$   
 $\approx$  2154  $2/3$  vulgar fraction two thirds

Table 11: RUMI special fractions

- [2] ابن البنا المراكشي، القضاء في العمل بالرومي، مخطوط بالخزانة الوطنية بالرباط تحت رقم ق 416 مجموعة ص 425-432
- [3] احمد ابن الصياهي سكرج، إرشاد المتعلم والناسي في صفة أشكال القلم الناسي، طبعة فاس، 1316هـ (المكتبة الوطنية 17000989)
- [4] قاسم بن أحمد السامرائي، الأرقام في المشرق عربة التجار وفي الغرب الأوربي سنسكريتية هندية الدثار، عالم الكتب، المجلد التاسع عشر، العدد الخامس والسادس مزدوجين عن الرقم العربي، 1998.
- [10] S. Bartina, *Cifras coptas y cultura árabe*, *Studia Papyrologica* 7 (1968), 199-210.
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- [16] G. Levi della Vida, *Appunti e quesiti di storia letteraria araba: Numerali greci in documenti arabo-spagnoli*, *Rivista degli studi orientali* 14 (1933), 249-283.  
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<http://cura.free.fr/quinq/04bezza.html>  
<http://web.uni-bamberg.de/hunbib/melcom/Sagaria%20Rossi-1.html>
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- [19] Driss Lamrabet, *Aperçu sur les systèmes de numération en usage au Maghreb du XVIIe siècle*, Publications de la Faculté des Lettres et des Sciences Humaines, Rabat ; Si Colloques et Séminaires n° 104, 2003, pp. 23-37.
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بسم الله الرحمن الرحيم  
 لا فضل بين العلم والنوم في الحساب فاليد الشيع العقب الجميل  
 العاقل المشاط الأجل الخوم إلى العباس الحمد من محمد بن عثمان الأزدي في  
 باب البناء العدي المتكشفت قدس الله روحه وجمه بمنه وبطوله وطوره  
**الحمد لله** صمد الأناقة لعبد ولا نهاية لخدمته والصلاة على محمد نبيه وعنده  
 وعلى آله وسلم وشرفه كثير **وتعريف هذا القضاة** من الملوك الروم في الحساب  
 على نحو ما وقع اختيار الروم من العمل من الله انتحل حسن التوفيق **باب**  
 في أسماء مراتب الأعداد وصيغة الرشم بالرومي اعلم أن المرتبة الأولى هي الأعداد  
 التسعة والثانية هي العشرات والتسعة والثالثة هي المئوز والتسعة والرابعة هي  
 الآلاف التسعة والخامسة هي عشرات الآلاف والتسعة والسادسة هي مئوز  
 الآلاف والتسعة والسابعة هي الآلاف التسعة وهكذا التي غير نهاية **والكل**  
 من أعداد المراتب الثلاثة الأولى ثم يخصصها واحد واحد ما يقع ويشتم  
 الآلاف وعشراتها ومئوزاتها عشرون الأعداد وعشراتها ومئوزاتها عشرون  
 وشكل التمثيل تحت العدة وهو صورة ذلك كله

١	٢	٣	٤	٥	٦	٧	٨	٩
١٠	١١	١٢	١٣	١٤	١٥	١٦	١٧	١٨
١٩	٢٠	٢١	٢٢	٢٣	٢٤	٢٥	٢٦	٢٧
٢٨	٢٩	٣٠	٣١	٣٢	٣٣	٣٤	٣٥	٣٦
٣٧	٣٨	٣٩	٤٠	٤١	٤٢	٤٣	٤٤	٤٥
٤٦	٤٧	٤٨	٤٩	٥٠	٥١	٥٢	٥٣	٥٤
٥٥	٥٦	٥٧	٥٨	٥٩	٦٠	٦١	٦٢	٦٣
٦٤	٦٥	٦٦	٦٧	٦٨	٦٩	٧٠	٧١	٧٢
٧٣	٧٤	٧٥	٧٦	٧٧	٧٨	٧٩	٨٠	٨١
٨٢	٨٣	٨٤	٨٥	٨٦	٨٧	٨٨	٨٩	٩٠
٩١	٩٢	٩٣	٩٤	٩٥	٩٦	٩٧	٩٨	٩٩

وكذا الآلاف والآلاف وعشراتها ومئوزاتها ترجع إلى عشرون  
 التي قبلها والعربية في مئوزها عشرون التي قبلها النوع ما يجب له منه  
 ذلك إلى غير نهاية **وأما** عشرون الكسور ورشم العدة  
 الذي يشتق منه الكسور وخطه جوفه خط يسمى كسيرا  
 ويكتب جوفه عده الأجزاء التي تشتق منه وكذا كسور  
 الكسور وهي امثلة منها رشم نصف عشر وثلاثين عشر  
 وبلانه ارباع عشر واربعة اقسام عشر وخمسة اقسام

عشر وسنة ارباع عشر وسبعة اثمان عشر وثمانية اقسام عشر  
 اعشار عشر وفرد ارباع اقسام العمل على ان يكون عشرا النصه هكذا من والربع عشرا  
 والثالث هكذا من او الثلثين هكذا من وايسر عملون الاجز التي مقاماتها اكثر من عشر  
 وان وقع لهم شيء من باب العمل صوفى على ما صنع فيه في باب الجمع بجزء هذا والكسور  
 المستعمله عندهم نوعان مضافه ومختلفة فالأما المضافة فيتقدم الكسور الذي مقامها  
 اعظم ويكون الاقل من عينه منخطف منه قليلا مثل خمسة اثمان وثلاثة اثمان عشر وثلاث  
 عشر من مئوزها هكذا **والأما** المختلفه في بعضها تحت بعض مثل خمسة اثمان وسنة  
 ارباع رشمها هكذا **والمثل** خمسة ارباع واربعة اقسام عشر وثلاثين خمس مئوز  
 وسبعة اثمان وثلاثة عشر ارباع عشر وربع مئوز وثمانية اقسام عشر وخمسة اقسام

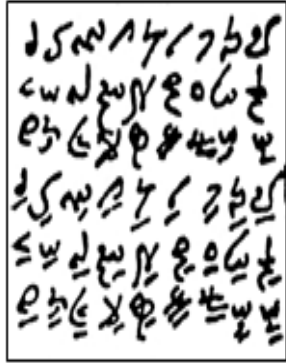
Figure 2: rumi numeral system in [1] page 1

بسم الله الرحمن الرحيم  
صلى الله على سيدنا محمد وعلى آله وصحبه وسلم تسليماً





لاقتضاب من العمل بالرومي في الحساب، تأليف الشيخ الفقيه الجليل الفاضل المشارك الأكمل المرحوم أبي العباس أحمد بن محمد بن عثمان الأزدي، عرف بابن البناء التدي المراكشي، قدس الله روحه ورحمه بته وفضلته وطوله<sup>1</sup>.






الحمد لله هذا لا انتطاع<sup>2</sup> لعدة<sup>3</sup> ولا هاية لحدده والصلاة على محمد نبيه وعبدته وعلى آله وسلم وشرفه كثيراً<sup>4</sup>. وبعد، فهذا اقتضاب من العمل بالرومي في الحساب على نحو ما وقع<sup>5</sup> اختيار الرؤساء<sup>6</sup> من العمال، وعن الله أسأل حسن التوفيق. باب في أسماء مراتب الأعداد وصفة الرشم بالرومي.





اعلم أن المرتبة الأولى هي الأحاد التسعة والثانية هي العشرات التسع والثالثة هي المئون التسع والرابعة هي الآلاف التسعة والخامسة هي عشرات الآلاف التسعة<sup>7</sup> والسادسة هي مئوا الآلاف التسع والسابعة هي آلاف الآلاف التسعة<sup>8</sup> وهكذا إلى غير هاية. ولكل عدد من أعداد المراتب الثلاث الأول رشم يخصه أولها واحد وآخرها تسع مائة ورشم الآلاف وعشراتها ومائتها كرشوم الأحاد وعشراتها ومائتها والفرق بينهما بال تكرار وشكل التكرار حفظه<sup>9</sup> تحت العدد وهذه صورة ذلك كله:




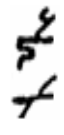
وكذلك آلاف الآلاف وعشراتها وهؤما ترجع إلى رشوم التي قبلها والفرق بينهما التكرار. لكل نوع ما يجب له منه<sup>10</sup> كذلك إلى غير هاية. وأما رشوم الكسور فرشم العدد الذي يشتق منه الكسر<sup>11</sup> ويخط فوفه خط يسمى كرسيا ويكتب فوفه عدة الأجزاء التي تشتق منه وكذلك كسور الكسور وهي

أمثلة منها رشم نصف  وثلاثين  وثلاثة أرباع  وأربعة أخماس  وخمسة

أسدس  وستة أسباع  وسبعة أثمان  وثمانية أتساع  وتسعة أعشار  وقد اصطلح أصحاب العمل على أن يرشوا

النصف هكذا  والرابع هكذا  والثالث هكذا  والثلاثين هكذا  ولا يستعملون الأجزاء التي مقامها أكثر من عشرة. وان وقع لهم شيء منها في العمل صرفوه على ما ستعرفه في باب الجمع بعد هنا. والكسور المستعملة عندهم نوعان مضافة ومختلفة فمما المضافة فيتقدم

الكسر الذي مقامه أعظم ويكون الأقل عن كمينه منخففاً منه قليلاً مثل خمسة أثمان وثلاثة أثمان ثمن وثلاث ثمن ثمن رشمها<sup>12</sup> هكذا  وأما



لمختلفة فيعضها تحت بعض مثل خمسة أثمان وستة أسباع رشمها هكذا

<sup>1</sup> ابن تيمية، في السخنة الكتابية: تأليف الشيخ الأجل الأستاذ الفاضل العلامة الفقيه أبو العباس أحمد بن محمد بن عثمان الأزدي، رحمه الله ورضي عنه

<sup>2</sup> رومه كلمة "نواع" ويرحم كلمة "انتطاع" كما روم في السخنة القبا

<sup>3</sup> في السخنة القباية: جده

<sup>4</sup> في السخنة القباية: وللهلاد والسهلاد على سيدنا محمد بيا وبيده وعلى آله وشرفه كثيراً

<sup>5</sup> في السخنة قباية: ربامد: مليا

<sup>6</sup> رومه كلمة "أروما" ويرحم كلمة "أروسل" كما روم في السخنة قباية ويقيم على نحو "أروسل"

<sup>7</sup> في السخنة قباية: الجمع

<sup>8</sup> في السخنة قباية: نمنان: والسماجة في آلاف الآلاف الخمسة ويرحم خذها تهبود سة سبهر نند في البرهون

<sup>9</sup> رومه كلمة "سختنا" ويرحم كلمة "سختنا" كما روم في السخنة القباية

Figure 3: rumi numeral system in [1] page 1 printed

In the name of The God, the most Merciful, the most Compassionate  
 The God prayed on Mohammed reigned and on his family and accompanied him  
 and peace of delivery

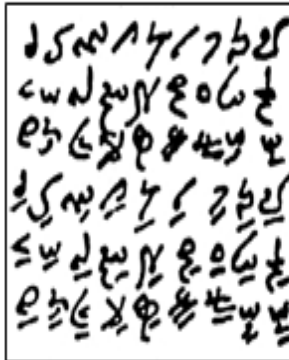
The shortening from the work in the Rwny in the calculation, formation of the participart virtuous of the magnificent jurist generous associated complete Abou AIEbas Ahmed Ben Mohammed Ben Othman al'azdy. He was introduced as mason's son numerical Alrwaakshy. The God sanctified went him and his uterus in his blessing and his casual dress and lengthens him.

The God praised neither his break-off for acne 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.

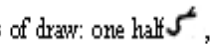










Knows that the rank first is the ones nine and the second is the tens nine and the third is the hundreds nine and the fourth is the thousands nine and the fifth is the tens of thousands nine and the sixth is the hundreds of thousands nine and the seventh is the thousands thousands nine and so on until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



For each number of the first three numbers ranks a sign witch 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 , two thirds , tree quarters , four fifths , five sixths , six sevenths , seven eighths , eight ninths , nine tenths . And leads the man working in make up provided that draw the one half in this way , and one quarter in this way 

and one third in this way  and the two third in this way . They don't use fractions which there 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 eighth and three eighth and third eighth in this way . As for different fraction, parts are under others parts example five eighths and six sevenths in this way

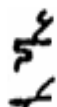


Figure 4: rumi numeral system in [1] page 1 translated in english

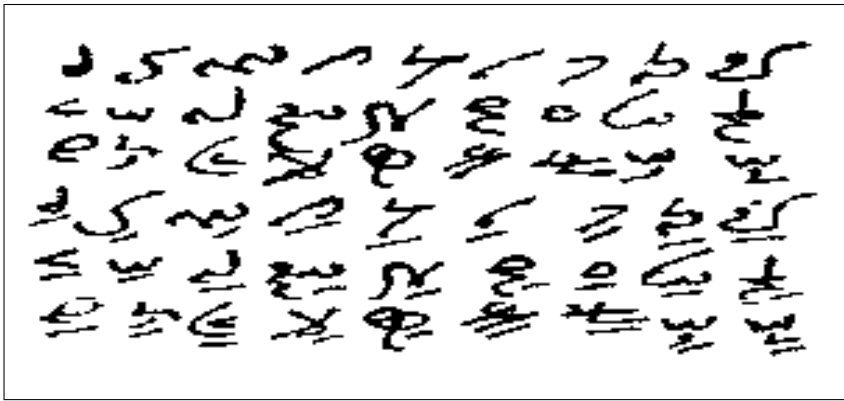


Figure 5: Integer rumi symbols in [1]

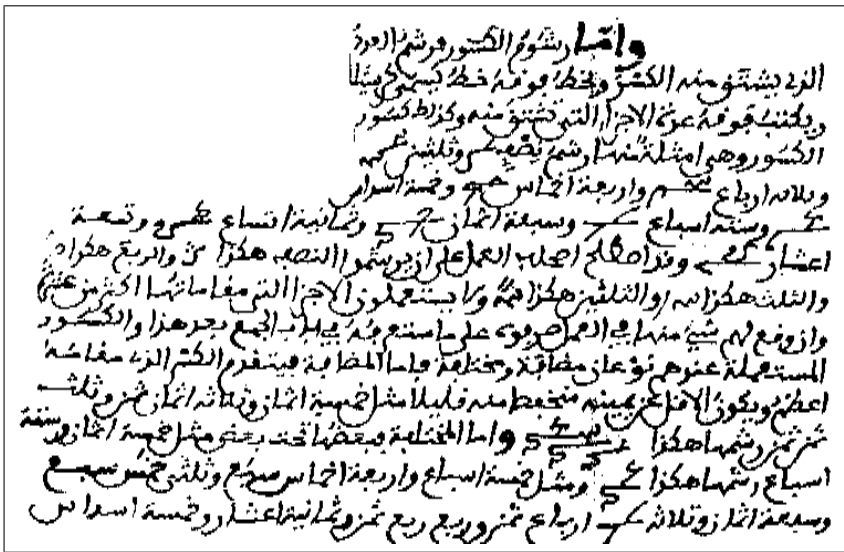


Figure 6: Fraction rumi symbols in [1]

١	٢	٣	٤	٥	٦	٧	٨	٩	١٠
١١	١٢	١٣	١٤	١٥	١٦	١٧	١٨	١٩	٢٠
٢١	٢٢	٢٣	٢٤	٢٥	٢٦	٢٧	٢٨	٢٩	٣٠
٣١	٣٢	٣٣	٣٤	٣٥	٣٦	٣٧	٣٨	٣٩	٤٠
٤١	٤٢	٤٣	٤٤	٤٥	٤٦	٤٧	٤٨	٤٩	٥٠
٥١	٥٢	٥٣	٥٤	٥٥	٥٦	٥٧	٥٨	٥٩	٦٠
٦١	٦٢	٦٣	٦٤	٦٥	٦٦	٦٧	٦٨	٦٩	٧٠
٧١	٧٢	٧٣	٧٤	٧٥	٧٦	٧٧	٧٨	٧٩	٨٠
٨١	٨٢	٨٣	٨٤	٨٥	٨٦	٨٧	٨٨	٨٩	٩٠
٩١	٩٢	٩٣	٩٤	٩٥	٩٦	٩٧	٩٨	٩٩	١٠٠

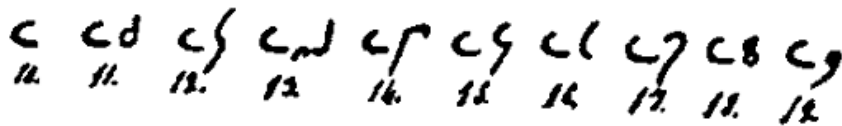
Figure 7: Examples in [3]

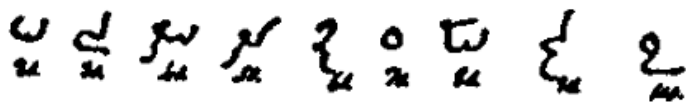


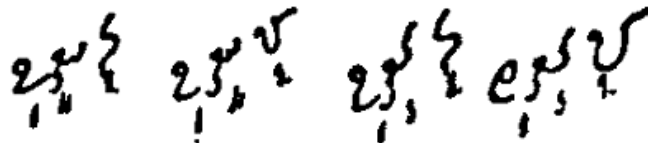


parum dirutus, necesse fuit abscidere folia quæ inutilia evaserant; hæc suspitio confirmatur ex facto, quod folia octogesimo posteriora morsus vermium majores habent præcipue circa folium centesimum tertium; et notandum est hos morsus jam in codice existentes esse cum collatio, saltem secunda fiebat, nam quidam restaurati fuere, ut videtur ab antiquo et verba a vermibus plene corrosa in margine explicantur: charta antiquioris codicis major erat, nam a folio trigesimo nono usque ad centesimum quintum vestigia antiquioris foliorum numerationis existunt, nam numeratio ex magna parte abscisa fuit: in foliis secundæ partis nihil hujusmodi numerationis distinguitur, et breves notæ marginales, præcipue verbum بلغت pluries in margine primæ partis scriptum fere evanuit.

SPECIMEN NUMERATIONIS FOLIORUM IN CODICE ESCURIALENSI.


  
 10 11 12 13 14 15 16 17 18 19


  
 20 21 22 23 24 25 26 27 28 29


  
 30 31 32 33 34

*Foliorum numeratio.* Codex habet foliorum numerationem modernam, factam postquam codex a librario numerationis arabicæ imperito compactus est; a folio enim secundo transilire necesse fuit ad folium decimum septimum et a folio vigesimo secundo iterum ad tertium recedere.

Ex foliorum numeratione antiqua codex centum sexaginta

Figure 9: Examples from [4]

2

ARV, Clero, libro 3850.

2 2 2	
1 1 7	
6 8	
8 3	+
5 6	
4 6	
3 8	
2 8	
4 15 0	

3

ARV, Clero, libro 3850.

2 17 11	
2 15 4	+
5 13 3	

4

ARV, Clero, legajo 188/1.

15 0 0	
2 0 0	+
3 0 0	
20 0 0	

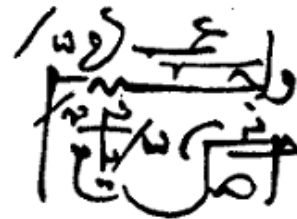
15 0 0	
2 0 0	+
0 12 0	
0 15 4	
18 7 4	
4 0 0	+
22 7 4	

Figure 10: Examples in [15] pages 50-51 from [4]

ARV, Clero, libro 3850.

٩٤٠	7 5 4
-----	
١٤٠٠	3 16 11
-----	-----
٤٠٠	3 8 5
-----	-----
٤٤٠٠	53 19 0
-----	
٥٠٠	43 14 4
-----	-----
١٤٠٠	97 13 4
-----	
١٠٠	6 18 0
-----	
٤٠٠	5 3 10
-----	-----
٥٠٠	1 14 2

Seco de Lucena (1961) documento nº 12 (facsimil).



Base ( <u>asl</u> ) :	26 2 4
Vendedor ( <u>hā'i'</u> ) :	3 2
	-----
Impuesto ( <u>wāyiba</u> ) :	29 5 -

Nota: El resultado de la suma se ha redondeado por exceso.

Figure 11: Examples in [15] pages 52-53 from [4]