L2/09-141

Proposal to Encode the Grantha Script in the Basic Multilingual Plane (BMP) of ISO/IEC 10646

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1.0 Introduction

This is a proposal to encode the Grantha script in the Universal Character Set (ISO/IEC 10646). The Grantha script which ultimately derives from the ancient Asokan Brahmi script is a major script living in South India, especially in the State of Tamil Nadu, India and in Sri Lanka and is used to print Sanskrit (Indo-Aryan) language books used by Hindus and Jains in their temples, Jaina basti centers, Yoga camps, etc., Inscriptions exist on the huge walls of Hindu temples, Buddhist vihars, Jain bastis and palaces spanning for over a millennium from South India. Many thousands of printed books also exist in south Indian and Sri Lankan libraries in the Grantha script. In computers, many types of Grantha fonts have begun to appear and it is appropriate to encode the Grantha script in Unicode at the present time. It is proposed that the Grantha script code chart follows the same pattern laid out originally in ISCII-1988 just like the other major scripts of India such as Devanagari, Tamil and Malayalam in Unicode.

2.0 History of the Grantha Script

There are several thousands of Grantha script printed works and palm-leaf manuscripts (~ 200 K) in the libraries of south India such as Adyar Theosophical Society Library at Chennai, Tamil Sangam Library at Madurai, National Library at N. Delhi, French Institute of Indology at Pondicheri, Jaffna Library in Sri Lanka, Royal Collections Library in Thailand, British Library in London, U.K. and so on. Oriental Collections at Mysore, Karnataka and The Trivandrum Palace Manuscripts Library, Kerala etc., are depositories of vast collections of palm-leaf manuscripts in the Grantha script. The non-availability of reliable and across-the-platform electronic ways to communicate in the Grantha script in computers and in the Web, and the *only* availability of a mono-script (Devanagari) to non-specialist common public in south India and their Diaspora has been a major disadvantage for the users of the Grantha script. Once Grantha script is encoded in Unicode and aesthetically pleasing Grantha Unicode fonts with as many consonant clusters as possible become available, the study of Sanskrit and Tamil in the Grantha script will receive a major boost worldwide, and it is desired that Western universities start giving equal importance to the southern script, Grantha as much as the northern Devanagari script as different Indian states use their own script to write Sanskrit texts and passages. While Telugu, Malayalam or Kannada scripts are adequate to write Indo-Aryan languages such as Hindi or Sanskrit, Tamil script does not have the aspirated and voiced letters and so, encoding Grantha script in Unicode is needed to fill the gap.

Traditionally Tamils employ the Grantha script to write Indo-Aryan language texts such as those in Sanskrit, Pali or Prakrit. The Grantha script is genetically related to scripts such as Tamil, Malayalam, Telugu, Sinhala and Kannada or even the Thai script.

Once the Grantha script becomes available in Unicode, South India's booming Computer industry, in a noble gesture of reverence to the subcontinent cultural heritage, will bestow with resources to propagate the Grantha script's future much further and on par with the use of Indic scripts like Devanagari or Tamil in the Net. Referring to the origin of the Grantha script, Art L. Basham in his famous book, *The Wonder that was India* (1959, Reprint:1980 edition, Delhi, pg. 400) noted that in Central India, a script evolved in the 5th and 6th centuries mostly having a square shape whereas the one that was evolved in the South India was more angular in form. Referring to the Grantha script Prof. A. L. Basham stated that "the Tamils on the other hand, evolved an angular script known as Grantha, which is still sometimes used in the Tamil country for writing Sanskrit, and from which the modern Tamil script is derived." Though nowadays, with more discovery of Tamil Brahmi inscriptions in the caves, dated to 3rd century BC to 4th century AD, and decipherment of those cave inscriptions, the general scholarly opinion is that both Tamil and Grantha scripts originate in the Tamil Brahmi inscriptions found in Tamil Nadu state (Iravatham Mahadevan, *Early Tamil Epigraphy*, Harvard Oriental Series, 2003).

Like the ancient Tamil script encoded in Unicode, the origin of the Grantha script is from the Tamil Cave Brahmi script, a variety of Dravidi script belonging to the Southern Brahmi family (page 64, Ref. [2]). Among the many scripts of India and South East Asia that originated from Brahmi, Grantha script has the unique distinction of preserving a good number of Brahmi characteristics. The term, *Grantha*, refers to a bundle of palm-leaves, and hence it originally means a *book* in India as Guru Granth Saheb means the holy book of the Sikh religion in Punjab, India.

3.0 Encoding Model of the Grantha Script in Unicode

Grantha script is an abugida of the Brahmic type. Like all major scripts of India in the Unicode such as Devanagari, Bengali or Tamil, it is requested that the Grantha script be encoded with a similar code layout originating in ISCII-1988 in the Basic Multilingual Plane of Unicode. The parallel code layout for Grantha script will emphasize the structural similarity of the Brahmic scripts of India and follows the stated intention of the Indian coding standard to enable one-to-one mappings between analogous coding positions in different scripts in the Brahmic family.

The Grantha script, as the four major Dravidian scripts of south India and also the Sinhala script of Sri Lanka had their patronage from Pallava dynasty of south India. Later, kings from Chola, Pandya and Chera lands contributed to its growth substantially. The revival of the Grantha script can be seen in the growth of printing presses using Grantha fonts in Tamil Nadu and Sri Lanka. Because of the complex conjunct characters present, Grantha has to wait till the development OpenType font technologies. Grantha script use in computers is expected to grow substantially as south Indians in general will be more comfortable with Grantha script as a substitute for Devanagari script using

auto-transliteration software (e.g. Extensions in Firefox browsers). The current situation of Grantha script in the Web resembles the situation of Devanagari script right after the Indian Independence in 1947. When good Unicode fonts and text editors are provided, the Grantha script use as a viable alternative for Devanagari script for South Indians in the computers and web will naturally develop in widespread usage. Cf. Christopher King, One Language, Two Scripts, Oxford University Press, 1994 describes the analogous situation between Hindi and Urdu scripts in North India.

Like the code chart layout parallel to major scripts of India such as Devanagari, the Grantha script, being a living contemporary script, is requested to be placed in the Unicode BMP. This will facilitate development and easy adaptation of classical Sanskrit, Hindi, … web pages in Grantha script from Devanagari pages and vice-versa. Students of Sanskrit, Hindi in Western universities will have a choice to read the texts in Grantha script itself. It is requested that Grantha script not be placed in SMP along with extinct scripts of India. Grantha script is living, and its use growing as seen in the growth of printing presses in many towns of South India. In the Internet, Grantha script has a good future as an alternate for Devanagari script web pages.

4.0 Dravidian Language letters in the Grantha Script Block

Devanagari script in Unicode allows for the transcription of Dravidian language letters – vowels short *e*, short *o*, consonants *RRA, LLLA* and *NNNA*. In a similar fashion, in order to facilitate the transliteration from the four Dravidian language scripts and Devanagari script, five letters from Dravidian languages need to be encoded in the Grantha script block. Samples are included in Section 7.0. Adding the capability to transcribe the Dravidian language letters is called "extended" Devanagari or Grantha script in literature. These Dravidian letters in Grantha script, as in Devanagari, are essential to write down nouns such as personal, river and place names and so on.

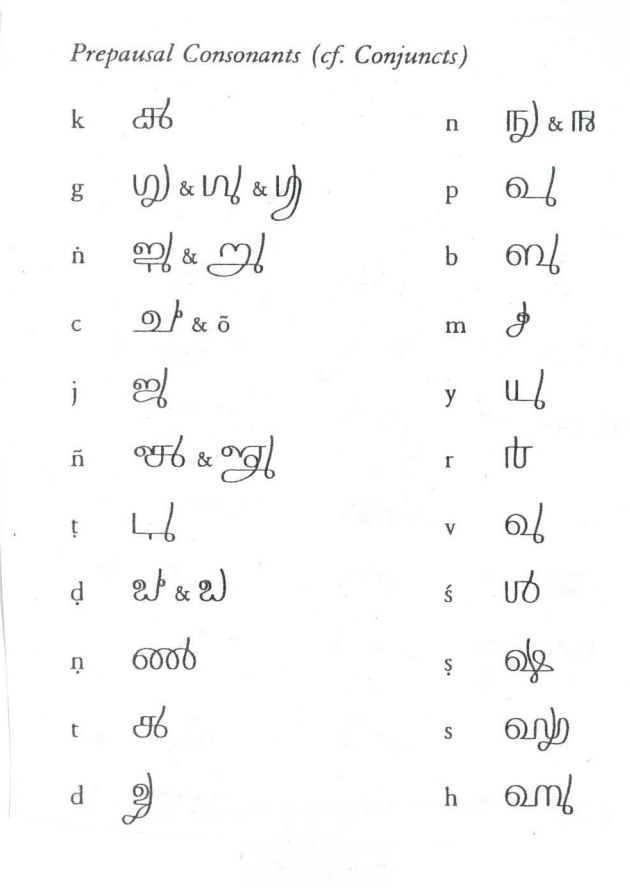
R. Gruenendahl, Ref. [1], page xiiv, states the need for short *e* and short *o* vowels: "Both long and short diphthongs (*elē, olō*), the distinction of which is a characteristic of several Dravidian languages and scripts, have found their way into South Indian Sanskrit manuscripts and prints." These short letters are usually indicated using a dot (*puLLi*) sign over the corresponding long vowels.

On the transcription of Dravidian language letters – vowels short *e*, short *o*, consonants *RRA, LLLA* and *NNNA* in the Grantha script, P. Visalakshy (ref. [2]. Page 66) states that " The variety of Grantha script suitable enough to represent both Tamil and Sanskrit is known as 'Tamil Grantha' or 'Grantha Tamil.' The earliest form of Grantha characters so far noticed is from the Pallava kings of the 5^{th} and 6^{th} centuries". These letters usually form conjunct cluster letters in words.

5.0 Grantha Chillu Marker code point

Malayalam has a few number of prepausal consonants (known as *chillus*) where the inherent letter, ***a*** is killed and six of these Chillu letters have been atomically encoded in

Unicode 5.1. Since Grantha script has the potential of creating a chillu consonant form almost on any consonant, atomic code point for every Grantha Chillu consonant is unnecessary and impractical. A combining Chillu marker sign with the same properties as Virama sign is proposed in the Grantha code chart. The following are the 22 chillu consonants commonly known to exist in the Grantha script (page 16, R. Gruenendahl, Ref. [1]).



6.0 Grantha post-consonantal *r*, post-consonantal *y* and pre-consonantal *r* forms

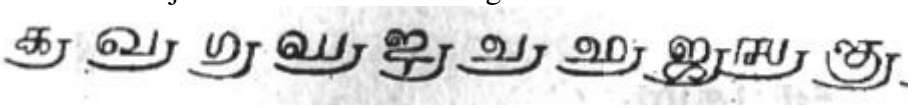
Font makers need to implement post-consonantal *r*, post-consonantal *y* and pre-consonantal *r* forms as shown in page 95, Ref. [2] which is reproduced below. Virama combining sign is used for this purpose in Indic scripts. For example, the Grantha script sequences will be: tra = <TA, VIRAMA, RA>, rta = <RA, VIRAMA, TA> and kya = <KA, VIRAMA, YA>.

The symbol ்ய uniformly represents ' y ' and is added to the base consonant letters.

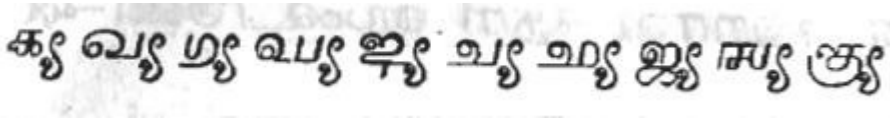
eg:-. க்ய (kya), த்ய (tya), ந்ய (nya), ப்ய (pya)** . ' r ' is represented by two subsidiary symbols ◌் and ◌்ர. When ' r ' follows a consonant the subsidiary symbol ◌் is used. eg. த்ர (tra), ப்ர (pra), க்ர (kra). When ' r ' precedes a consonant, the symbol ' ◌்ர' is used. However unlike most other Indian writing systems, in Grantha script the symbol for preceding ' r ' ◌்ர is used after the consonant letter. Eg:- ர்ம (rma), ர்ச (rca), க்ர (rka).

From 20th century printed books, an example is given at
http://www.mudgala.com/articles/grantha.html

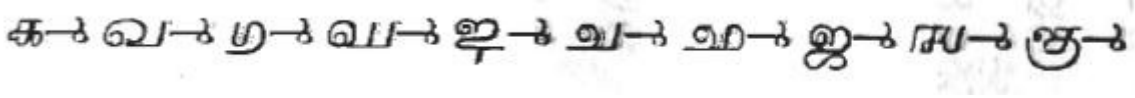
Conjucation of ka and ca vargas with ra



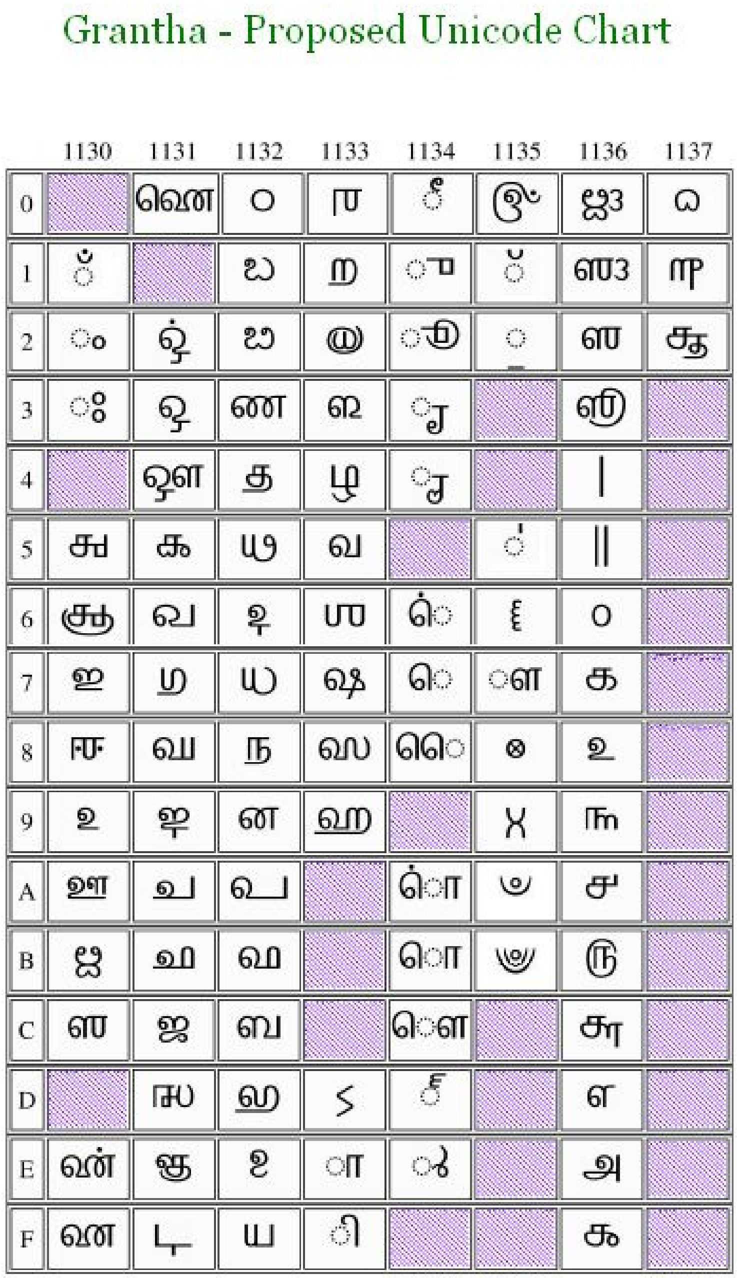
Conjucation of ka and ca vargas with ya



Conjucations of ra with the ka and ca vargas



7.0 Grantha Script – Proposed Unicode Chart



8.0 Grantha Script Character Names in Unicode Code Chart

Various signs

11301 GRANTHA SIGN ANUNASIKA
= candrabindu
11302 GRANTHA SIGN ANUSVARA
11303 GRANTHA SIGN VISARGA

Independent vowels

11305 GRANTHA LETTER A
11306 GRANTHA LETTER AA
11307 GRANTHA LETTER I
11308 GRANTHA LETTER II
11309 GRANTHA LETTER U
1130A GRANTHA LETTER UU
1130B GRANTHA LETTER VOCALIC R
1130C GRANTHA LETTER VOCALIC L
1130E GRANTHA LETTER E
• for transcribing Dravidian short e
1130F GRANTHA LETTER EE
11310 GRANTHA LETTER AI
11312 GRANTHA LETTER O
• for transcribing Dravidian short o
11313 GRANTHA LETTER OO
11314 GRANTHA LETTER AU

Consonants

11315 GRANTHA LETTER KA
11316 GRANTHA LETTER KHA
11317 GRANTHA LETTER GA
11318 GRANTHA LETTER GHA
11319 GRANTHA LETTER NGA
1131A GRANTHA LETTER CA
1131B GRANTHA LETTER CHA
1131C GRANTHA LETTER JA
1131D GRANTHA LETTER JHA
1131E GRANTHA LETTER NYA
1131F GRANTHA LETTER TTA
11320 GRANTHA LETTER TTHA
11321 GRANTHA LETTER DDA
11322 GRANTHA LETTER DDHA
11323 GRANTHA LETTER NNA
11324 GRANTHA LETTER TA

11325 GRANTHA LETTER THA
11326 GRANTHA LETTER DA
11327 GRANTHA LETTER DHA
11328 GRANTHA LETTER NA
11329 GRANTHA LETTER NNNA
- for transcribing Dravidian alveolar n

1132A GRANTHA LETTER PA
1132B GRANTHA LETTER PHA
1132C GRANTHA LETTER BA
1132D GRANTHA LETTER BHA
1132E GRANTHA LETTER MA
1132F GRANTHA LETTER YA
11330 GRANTHA LETTER RA
11331 GRANTHA LETTER RRA
- for transcribing Dravidian trilled alveolar r

11332 GRANTHA LETTER LA
11333 GRANTHA LETTER LLA
11334 GRANTHA LETTER LLLA
- for transcribing Dravidian retroflex continuant l

11335 GRANTHA LETTER VA
11336 GRANTHA LETTER SHA
11337 GRANTHA LETTER SSA
11338 GRANTHA LETTER SA
11339 GRANTHA LETTER HA

Various signs

1133D GRANTHA SIGN AVAGRAHA

Dependent vowel signs

1133E GRANTHA VOWEL SIGN AA
1133F GRANTHA VOWEL SIGN I
11340 GRANTHA VOWEL SIGN II
11341 GRANTHA VOWEL SIGN U
11342 GRANTHA VOWEL SIGN UU
11343 GRANTHA VOWEL SIGN VOCALIC R
11344 GRANTHA VOWEL SIGN VOCALIC RR
11346 GRANTHA VOWEL SIGN E
- stands to the left of the consonant
- for transcribing Dravidian short e matra

11347 GRANTHA VOWEL SIGN EE
- stands to the left of the consonant

11348 GRANTHA VOWEL SIGN AI
- stands to the left of the consonant

Two-part dependent vowel signs

These two-part dependent vowel signs have glyph pieces which stand on both sides of the consonant. These vowel signs follow the consonant in logical order, and should be handled as a unit for most processing.

1134A GRANTHA VOWEL SIGN O
- for transcribing Dravidian short o matra

1134B GRANTHA VOWEL SIGN OO
1134C GRANTHA VOWEL SIGN AU

Various signs

1134D GRANTHA SIGN VIRAMA
1134E GRANTHA SIGN CHILLU MARKER
11350 GRANTHA OM
11351 GRANTHA STRESS SIGN UDATTA
11352 GRANTHA STRESS SIGN ANUDATTA
11355 GRANTHA STRESS SIGN DIIRGHA SVARITA
11356 GRANTHA PLUTA
11357 GRANTHA AU LENGTH MARK
- only a representation of the right half of 1134C

11358 GRANTHA JIHVAMULIYA
11359 GRANTHA UPADHMANIYA
1135A GRANTHA SIGN GUM
1135B GRANTHA SIGN GGU

Generic additions

11360 GRANTHA LETTER VOCALIC RR
11361 GRANTHA LETTER VOCALIC LL
11362 GRANTHA VOWEL SIGN VOCALIC L
11363 GRANTHA VOWEL SIGN VOCALIC LL
11364 GRANTHA DANDA
= puurna viraama

11364 GRANTHA DOUBLE DANDA
= diirgha viraama

Digits

11366 GRANTHA DIGIT ZERO
11367 GRANTHA DIGIT ONE
11368 GRANTHA DIGIT TWO
11369 GRANTHA DIGIT THREE
1136A GRANTHA DIGIT FOUR
1136B GRANTHA DIGIT FIVE

1136C GRANTHA DIGIT SIX
1136D GRANTHA DIGIT SEVEN
1136E GRANTHA DIGIT EIGHT
1136F GRANTHA DIGIT NINE

Grantha numerics

11370 GRANTHA NUMBER TEN
11371 GRANTHA NUMBER ONE HUNDRED
11372 GRANTHA NUMBER ONE THOUSAND

The properties of the Grantha characters are the same as their parallel characters in other Indian scripts such as Devanagari or Tamil scripts, and those properties can be obtained by looking at the properties of characters in Unicode Character Database for Devanagari and Tamil scripts. The collating order for Grantha script is dependent upon the language represented by it, and in general, Devanagari collation order for Sanskrit texts and dictionaries is recommended for use in the Grantha script also.

9.0 References

[1] R. Gruenendahl, 2001, South Indian Scripts in Sanskrit Manuscripts and Prints Grantha Tamil – Malayalam – Telugu – Kannada – Nandinagari
O. Harrassowitz, Wiesbaden

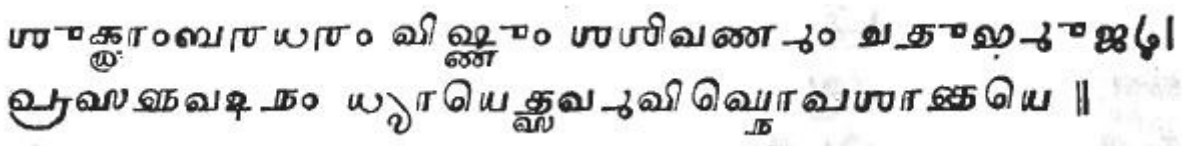
[2] P. Visalakshy, 2003, The Grantha Script, Dravidian Linguistics Association, St. Xavier's College, University of Kerala, Trivandrum, India.

[3] K. Venugopalan, A primer in Grantha characters,
St. Peter, Minn: James H. Nye 1983.
http://dsal.uchicago.edu/digbooks/dig_toc.html?BOOKID=PK419.V468_1983

[4] Iravatham Mahadevan, 2003, Early Tamil Epigraphy from the Earliest Times to the Sixth Century A.D, Harvard University Press.

[5] C. King, 1994, One Language, Two Scripts: The Hindi Movement in Nineteenth Century North India, Oxford University Press.

10.0 Grantha script samples from Printed books



shuklaambaradharaM vishNuM shashivarNam chaturbhujaM .
prasannavadanam dhyaayet sarvavighnopa shaantaye

Words with conjuncts:

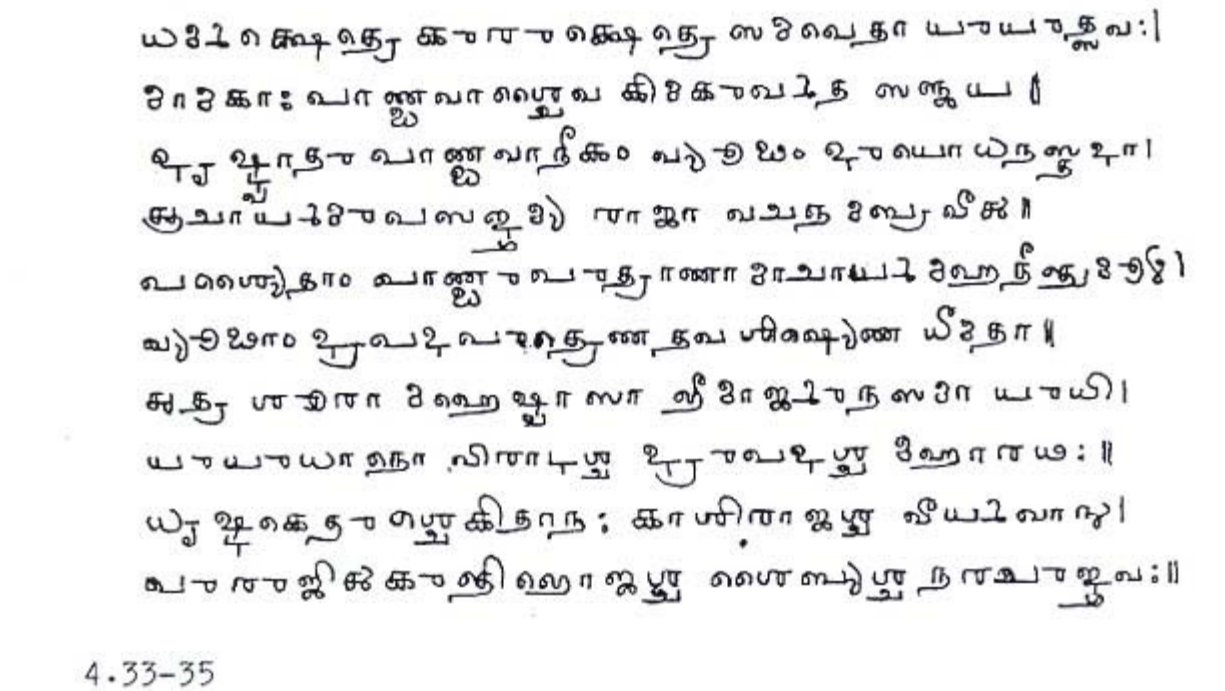
añcitaḥ	आञ्चित:	அஞ்சித:
kuñjaraḥ	कुञ्जर:	குஞ்ஜர:
ākarṣaṇam	आकर्षणम्	ஆகர்ஷணம்
agniḥ	आग्नि:	அக்நீ:
ātmā	आत्मा	ஆத்மா
piṅgalaḥ	पिङ्गल:	பிங்கல:
kuṇḍalam	कुण्डलम्	குண்டலம் (ண்ட)
tāmbūlam	ताम्बूलम्	தாம்பூலம்
induḥ	इन्दु:	இந்து:
vijñānam	विज्ञानम्	விஜ்ஞானம்
śrutvā	श्रुत्वा	ஶ்ருத்வா
indrāṇī	इन्द्राणी	இந்த்ராணீ
dantī	दन्ती	தந்தீ
pārthivaḥ	पार्थिव:	பார்திவ:
kārṣṇyam	कार्ष्ण्यम्	கார்ஷ்ண்யம்
pārṣṇiḥ	पार्ष्णि:	பார்ஷ்ணி:
kasmiṁścit	कस्मिंश्चित्	கஸ்மிம்ஶ்சித் (ஸ்மி)
dhārṣṭyam	धार्ष्ट्यम्	தார்ஷ்ட்யம்
karpūraḥ	कर्पूर:	கர்பூர:
parvan	पर्वन्	பர்வன்
bandhūkaḥ	बन्धूक:	பந்தூக:
vandyaḥ	वन्द्य:	வந்த்ய:
ucchritam	उच्छ्रितम्	உச்ச்ரிதம்
dāridryam	दारिद्र्यम्	தாரித்ர்யம்
pārśvam	पार्श्वम्	பார்ஶ்வம்
dhairyam	धैर्यम्	தைர்யம் (ர்ய)
chandas	छन्दस	சந்தஸ் (ந்த)
udaraḥ	उदर:	உதர:

(from K. Venugopalan, 1983).

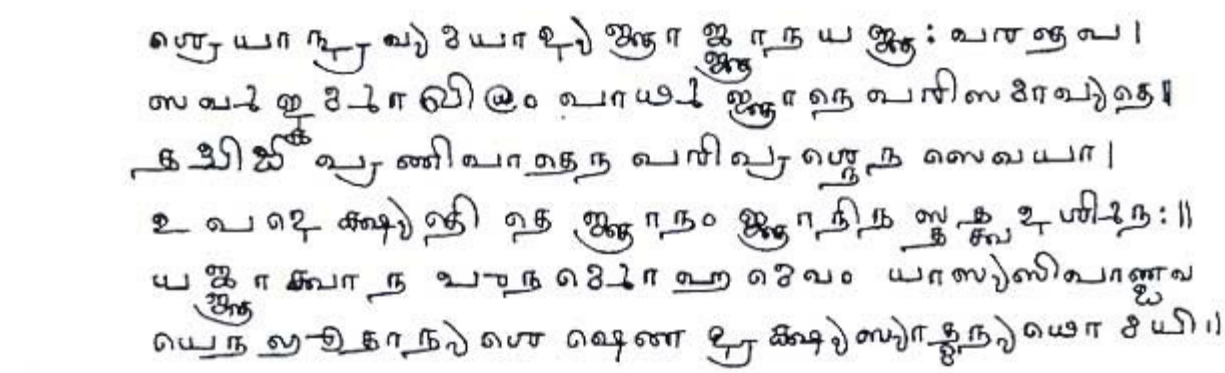
Passages for Reading Practice

From the Bhagavadgītā:

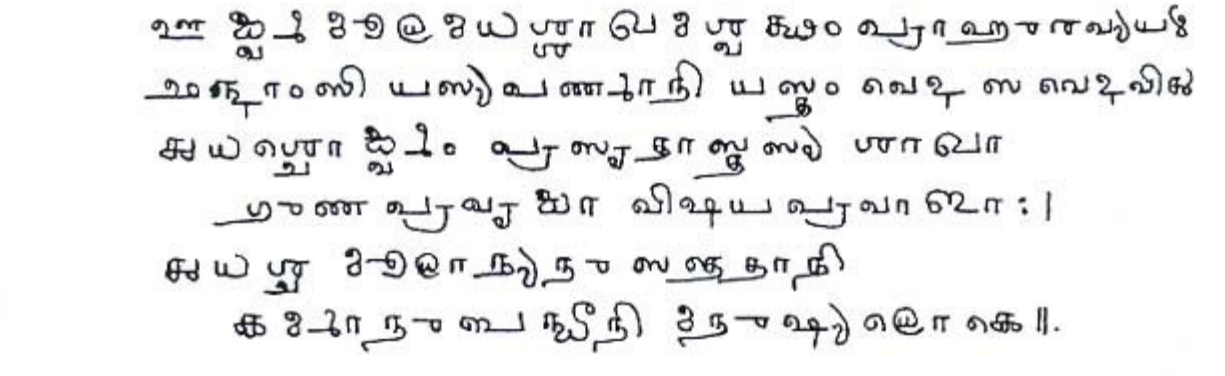
1.1-5



4.33-35



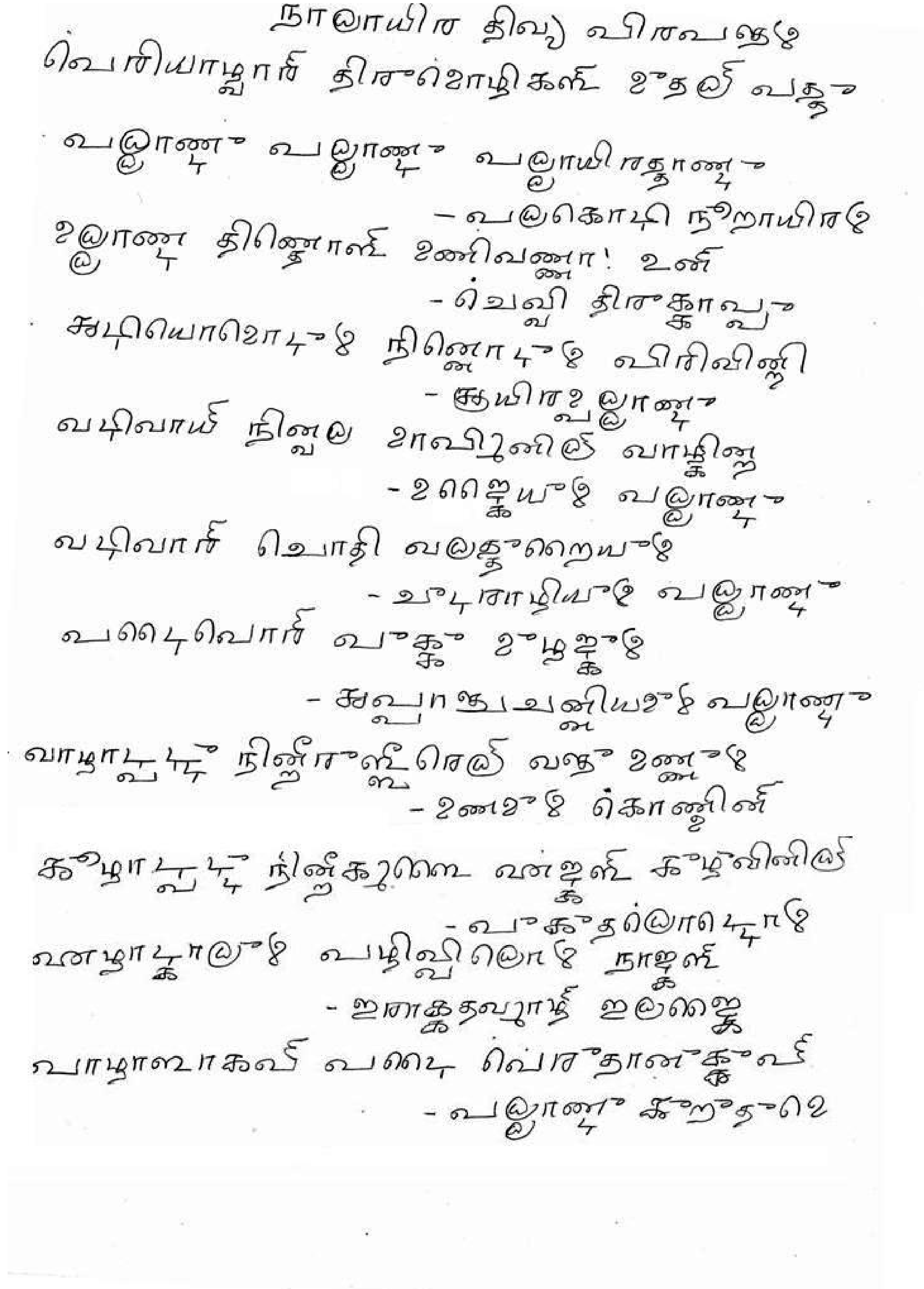
15.1-2



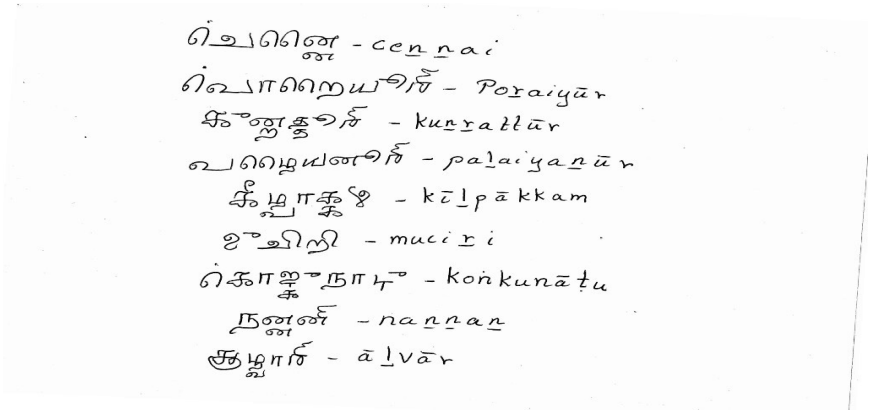
The Grantha character glyphs and names in Sections 7.0 and 8.0 have been selected from the source material listed in Section 9.0 References. All the Indo-Aryan language characters are listed in Gruenendahl and Visalakshy's useful study. For example, the Vocalic Vowels and Vowel Signs are from Gruenendahl's book [Ref. 1]. The Grantha numerics and digits are taken from P. Visalakshy's book [Ref. 2]. The glyphs for Pluta, Jihvamuliya and Upadhmaniya letters are given in Ref. [1].

Grantha anunasika sign is taken from Grantha dictionary and the following is from the e-GranTamil font used widely in Grantha publishing houses in Chennai, Tamil Nadu, India.Grantha Anunasika sign can take udatta and anudatta stress signs on top of it

The Grantha script code chart also includes the Dravidian letters (Section 4.0) needed for transcribing Dravidian texts and nouns such as place names inscribed in other Indian scripts such as Tamil or Devanagari. J. R. Marr, ("Some Manuscripts in the Grantha Script in Bangkok", Bulletin of the School of Oriental and African Studies, XXXII, pt. 2, 1969. pp. 281-322) describes several Tamil/Dravidian texts written in the Grantha script in Thailand and are still used in royal coronation rituals. Some samples provided from Samskrita Granthalipi Sabha, Chennai (Madras), India are included as samples in the next page.



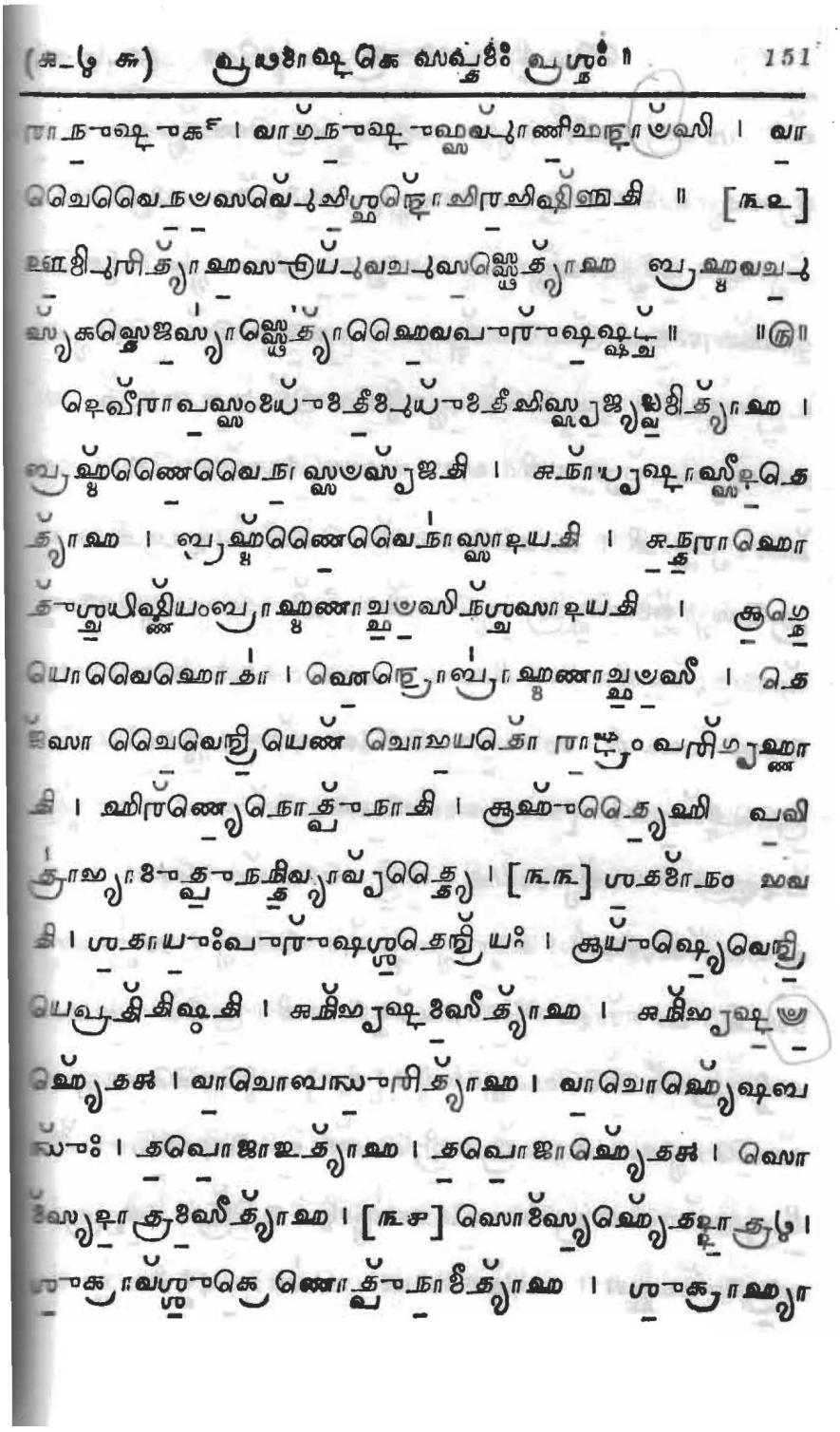
Naalaayira Divya Prabandham, a Tamil text in Grantha script



Dravidian nouns in the Grantha script

Next, Vedic combining stress signs, Udatta, Anudatta, Diirgha Svarita are shown from a printed book example. Also, given are the Grantha signs, GUM and GGU which are proposed in the Grantha Code Chart (Section 7.0).

All the Grantha characters and their glyph shapes have been checked with user community in India, and USA, and also from various printed books, manuscripts and web resources. It is requested from Unicode Tech Committee to assign a block in the BMP for this contemporary Grantha script which has ancient origins and contributed to the literacy not only in India but also many countries in South East Asia. Grantha script in Unicode will assure it a bright future in the 21st century in the Web.



Acknowlwedgements: I sincerely thank Rajarathna Bhattar, James Kass and Vinodh Rajan for giving usage data, font and critical comments while preparing this Grantha Unicode proposal.

Naga Ganesan April 22, 2009

ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646[1]
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:** Proposal to Encode the Grantha Script in the Basic Multilingual Plane (BMP) of ISO/IEC 10646
2. Requester's name: *Dr. Naga Ganesan (naa.ganesan@gmail.com), Houston, Texas*
3. Requester type (Member body/Liaison/Individual contribution): *Individual contribution*
4. Submission date: *April 22, 2009*
5. Requester's reference (if applicable): *N/A*
6. Choose one of the following:
   This is a complete proposal: *Yes*
   (or) More information will be provided later:

B. Technical – General

1. Choose one of the following:
   a. This proposal is for a new script (set of characters): *Yes*
      Proposed name of script: *Grantha*
   b. The proposal is for addition of character(s) to an existing block: *No.*
      Name of the existing block: *N/A*
2. Number of characters in proposal: *99*
3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary	X	B.1-Specialized (small collection)		B.2-Specialized (large collection)	
C-Major extinct		D-Attested extinct		E-Minor extinct	
F-Archaic Hieroglyphic or Ideographic				G-Obscure or questionable usage symbols	

4. Is a repertoire including character names provided? *Yes*
   a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? *Yes*
   b. Are the character shapes attached in a legible form suitable for review? *Yes*
5. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard? *James Kass, OpenType format*
   If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used: *Original design by jameskass@code2000.net, tools used – proprietary software*
6. References:
   a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? *Yes*
   b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? *Yes*
7. 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.*
   See text of proposal

8. 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.

[1] Form number: N3152-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, 2007-03, 2008-05)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? *No*
   If YES explain
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.)? *Yes*
   If YES, with whom? *Sri. Rajarathna Bhattar & South Indian Archakar Association, Madurai*
   If YES, available relevant documents: *See the proposal*
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? *Tamil community in India and abroad*
   Reference: *Tamils are a large ethnic group (75+ million worldwide) and Grantha script is used by them to write Indo-Aryan languages such as Sanskrit, Hindi.*
4. The context of use for the proposed characters (type of use; common or rare) *Common*
   Reference: *Mainly used to print Sanskrit religious texts, but can be used for any Indo-Aryan texts in e-mail and Web applications.*
5. Are the proposed characters in current use by the user community? Yes
   If YES, where? Reference: *In India, Sri Lanka, Singapore etc., there are Grantha presses in Srirangam, Madurai, Tirunelveli cities. Grantha fonts (8-bit & non-Unicode) have begun to appear in the Web.*
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? *Yes*
   If YES, is a rationale provided? *Yes*
   If YES, reference: *See text of proposal*
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? *No*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? *No*
   If YES, is a rationale for its inclusion provided?
   If YES, reference:
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? *No*
    If YES, is a rationale for its inclusion provided?
    If YES, reference:
11. Does the proposal include use of combining characters and/or use of composite sequences? *Yes*
    If YES, is a rationale for such use provided? *Yes*
    If YES, reference: *See text of proposal*
    Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? *Yes*
    If YES, reference: *See text of proposal*
12. Does the proposal contain characters with any special properties such as control function or similar semantics? *Yes*
    If YES, describe in detail (include attachment if necessary)
    (a) Virama and (b) Chillu Marker signs. See text of proposal for the rationale to encode
13. Does the proposal contain any Ideographic compatibility character(s)? *No*
    If YES, is the equivalent corresponding unified ideographic character(s) identified?
    If YES, reference: