

CTEVH CONFERENCE

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SAN FRANCISCO, CALIFORNIA

NUBS

NEMETH UNIFORM BRAILLE SYSTEM

Its implications to the

SCIENTIFIC

transcriber and reader

PRESENTED BY:

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INTRODUCTION

The first part of this two-part workshop covered the impact of this new braille system on the literary transcriber and reader. That session included some discussion about the philosophy and rationale for developing a new braille code or system. The hand-out for that session also explained one of the critical concepts of NUBS – that of the two modes – narrative and notational. An understanding of that aspect of the new system is vital. If you were not able to attend that session, you are welcome to ask for a copy of that handout. It gives a fairly comprehensive argument for the development of a new braille code and Dr. Nemeth's approach to the task.

The Nemeth Braille Code for Mathematics and Science Notation, 1972 Version, is used for the braille version of this workshop handout. It is also used in the simbraille examples, for representing the "current code" form of the example.

The topics addressed in this workshop include:

- Mathematical Operators

- Fractions

 - Vertical

 - Mixed

 - Quasi-Vertical

 - Complex

 - Spatial

 - Spatial Complex

 - Use of the Slash

- Superscripts and Subscripts

 - Numeric

 - Simple

 - Multilevel

 - Simultaneous and Non-simultaneous

- Cancellation and Renaming Digits in Subtraction

- Radicals

 - Simple

 - Nested

 - Indexed

 - Displayed

- Calculator and Computer Braille

Fortunately, a two-digit replacement number in a subtraction scheme is always in the range of 10 to 18 inclusive. Therefore, we are able to contrive a "trick" for entering this two-digit number into one cell. We enter this number as a dropped number, as usual. We now add dot 1 into the same cell to indicate that this is a two-digit number whose ten's place is 1.

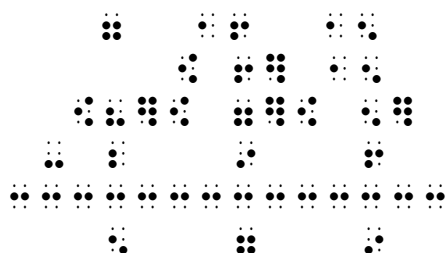
Thus the numbers from 10 to 18 would be represented in one cell as follows:

⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠
10	11	12	13	14	15	16	17	18

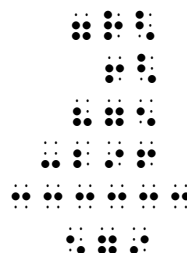
In this subtraction scheme, subtraction is immediately possible in every column. Therefore, there are no cancelled digits and replacement numbers use one cell.

$$\begin{array}{r}
 7 \ 16 \ 15 \\
 6 \ 15 \\
 \cancel{8} \ \cancel{7} \ \cancel{5} \\
 - 2 \ 9 \ 6 \\
 \hline
 5 \ 7 \ 9
 \end{array}$$

Current code:



NUBS:



See how clean this is. There is no need for any cancellation indicators and the alignment is maintained. In any subtraction problem, consisting of a minuend and a subtrahend, any line above the minuend would be regarded as "renamed" numbers.

CANCELLATION IN GENERAL

Subtraction schemes do not have a monopoly on the use of cancellation. In arithmetic, cancellation is used in the process of reducing fractions to lowest terms, and in the multiplication or division of fractions. In algebra, cancellation is used for

the same reasons. However, there we would be dealing with number-and-letter combinations rather than just with numbers as in arithmetic.

begin cancellation ⋮ (12346)
 end cancellation ⋮ (246)

If the text to be cancelled occupies one cell, the indicator ⋮ (456) must be placed above or below it, as appropriate.

EXAMPLES (showing cancellation)

$$\begin{array}{r} 1 \quad 1 \\ \cancel{7} \quad \cancel{4} \\ \hline \end{array} \times \begin{array}{r} 1 \\ \cancel{9} \\ \hline 2 \quad 3 \end{array} = \begin{array}{r} 1 \\ \hline 6 \end{array}$$

If the text to be cancelled occupies more than one cell, the begin-cancellation indicator and the end-cancellation indicator must be placed at the first and the last cell, respectively, of the text to be cancelled. These indicators should be placed above or below the text to be cancelled, as appropriate.

In this example, there are four terms to the left of the equal sign, each in parentheses. The third one is cancelled.

$$(x - a_1)(x - a_2)(x - a_3)(x - a_4) = 0$$

