About Coding of Mathematical Notations and Structure of Mathematical Information Systems "DIFFERENTIAL EQUATIONS"

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Abstract

Consider questions of structuring of the mathematical information systems (MIS) "Differential equations" and questions of coding of the mathematical notations when using the modern technologies of relationship Internet.

Keywords. Mathematical information systems, Differential equations, coding, mathematical notations, Internet.

Consider questions of structuring of the mathematical information systems (MIS) "Differential equations" and questions of coding of the mathematical notations when using the modern technologies of relationship Internet. Bring the basis structures of system "DIGRAN" (see Figure 2) [1] and system "ISDIFF" (see Figure 3), under development version MIS "Differential equations" [2-4], which is component part general system "Differential equations and dynamic systems". Systems are intended for the user-mathematics in the first place, using modern facilities to telecommunications and working with dynamic models.

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Known that, at present, does not exist an efficient way for expressing a standard mathematical expression in WWW (on Web pages). Accepted WWW consortium W3C and developed standard HTML-language hypertextual marking a document does not ensure a necessary way for the expression of mathematical notations.

Accepted two ask deciding for the presentation of mathematical notations in Web:

1. Presentation with HTML restrictions (rowwise ASCII coding);

2. Presentation of mathematical expression as gif scene (gif-image with obligatory alt-sign ASCII).

The ASCII coding to mathematical notations is possible both in one line, and in several lines. It allows also to enter, although and on primitive level, graphic image of mathematical object.

However, gif image of equations far off from ideal and has several defects: gif expressing will be printed as bitmaps, showing not more details, than appears on the screen, though browsers print a normal text in the full permit of printer, either as textual editors; the fonts used in gif equation are install at the autothread, while size of font of text of the document is control by browser user; boot pages, containing several gif equations comparatively slow, because gif expressing not efficient format of keeping for equations and boot each requires separate transactions with Web server; impossible do a searching for textual features or phrases in the equation, since no text in gif expressing; impossi-

```
index
  |____ help --------> default
        default        seek
        seek

seek
  |_____SSystem
        instrg -------> index
        help
        default

default
  |_____seek
        main
        main2
        .....
        main13
        fl1
        1_1_1
        1_1_2
        .....
        1_1_6
        fl8 --------> seek8
                      1_2_2_1
                      1_2_2_3
                      .......
                      1_2_2_73
        fl9 --------> seek9
                      1_2_3_1
                      .......
                      1_2_3_40
        fl10 -------> seek10
                      1_2_4_1
                      .......
                      1_2_4_15
        fl11 -------> seek11
                      1_2_5_1
                      .......
                      1_2_5_13
        help
        index
```

Figure 1: Example of structure "treediff"

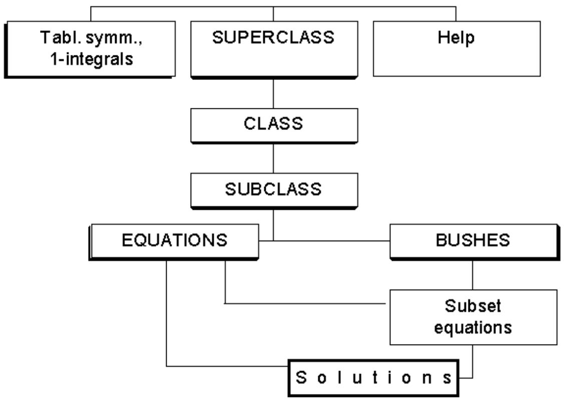

Figure 2: Basic structures of system "DIGRAN"

ble send an equation on other software for mathematical processing, as far as mathematical structure is not saved.

For converting the mathematical expressions in gif or dvi expressing (with provision for graphic possibilities of editor TeX) is accepted five strategies:

a) MS Word - Equation - Clipboard - Gif, or MS Word - Equation - Clipboard - Paste (in graph. program) - Gif;

b) MS Word - Equation - RTF - RTF to HTML, however RTF format not always readable;

c) TeXtoGif - a converter for short mathematical expressions, when each equation a friend for other is translate in Gif format (that is very exhausting procedure);

d) LaTeX2HTML - a converter for full LaTeX-documents;

e) HTeX - a preprocessor - a new strategic decision of problem an conversion. Such a formatting effectively increases HTML syntax on single new tag $< eq > ... < /eq >$.

Analysis of development of support mathematicians in HTML shows that wake perfecting are connected with introduction MathType 4.0, where is plan to enter base language of the presentation to mathematical notations MathML , based on extended language of the marking XML. As well as, with perfecting the possibilities HTML 4.0 (in contrast with the preceding version and with possibilities of special editors of type WebEdit Pro 2.0, HotDog 3.0.21, HoTMetaL Pro 4.0) on formatting, on inclusion of converters and views, on presence additional java-applets. Perspective and entering a mechanism a auto-style CSS (Cascading Style Sheets), interface font, size and determined information with tags of author.

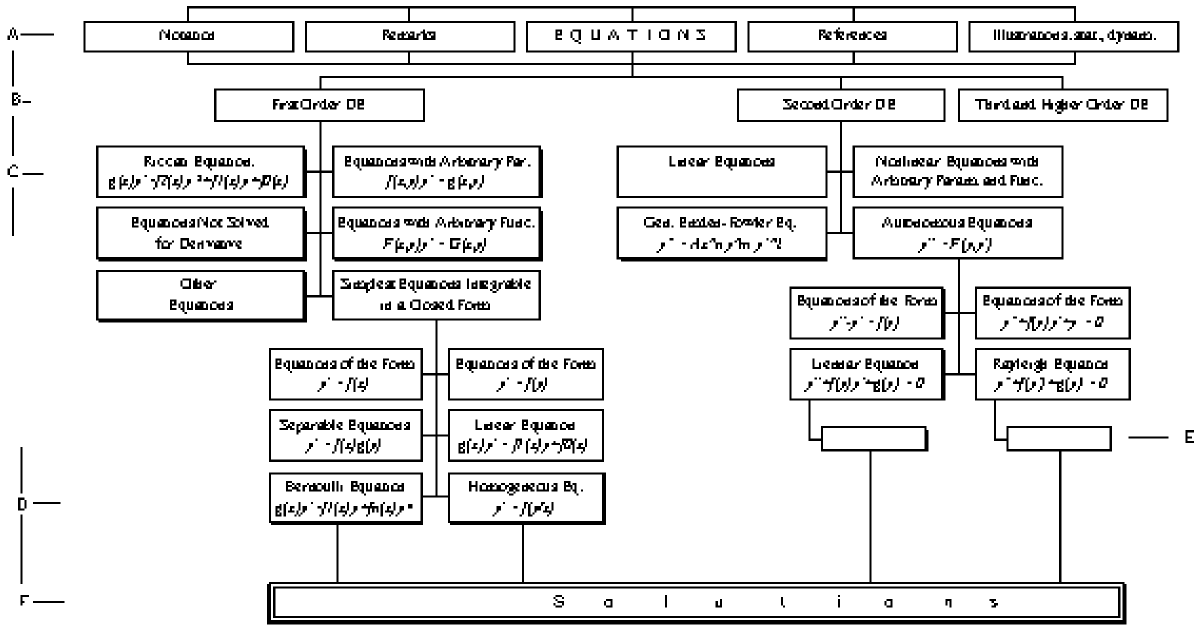

Figure 3: Basic structures of system "ISDIFF"

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