Intelligent Summarising and Browsing of Mathematical Expressions

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Prior Art

Computer algebra can generate large expressions.

Mathematica very large expressions are displayed in a nested interface; the function `Short` gives finer control

Maple outputs large matrices in a summarised form

Macsyma package `format` provides means for user-directed hierarchical structuring of expressions with navigation options

MatLab command `subexpr` rewrites a symbolic expression in terms of common subexpressions

Also work on representing mathematical expressions for visually impaired people

All very system-specific

Efficiency

can be measured in various ways

- **graphical** size of the displayed expression, more specifically, the area of the box it is displayed in
- **time** taken to display the expression
- **storage** required for the mathematical object (+extras)
- **semantics** balance between the richness of encoding and the economy of graphical output

Alas, last is purpose-dependent

Solutions of an expression

Describe the solutions of

$$(x-1)^2(x-\sqrt{y^5+y^4+y^3+y^2+y+1})$$
$$\times(x-\sqrt[3]{y^5+y^4+y^3+y^2+y+1})$$

How many? A, A, B, C

What form? 1^2, $\sqrt{D}, \sqrt[3]{D}$

(where 1^2 means "1 with multiplicity 2")

N.B. Recognising commonality of D

An OpenMath Browser

`http://staff.bath.ac.uk/masjhd/OMBrowser/OpenMathBrowser.html`

To explore these issues in a system-independent way.

Foundation for common tools?

INRIA	parser was for OpenMath 1.0, so we used
RIACA	library for parsing OpenMath 2.0
	(needed extending to fully implement OpenMath Reference objects)
	Also, we hash while parsing, for commonality
`om2la`	for translating the OpenMath object into LaTeX
`JLatexMath`	for displaying