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| **FR 1.1** | |
| Term entered: | x+1 \* (-function(count) / sin(x^2)) - 2.4 |
| Rules entered: | |
|  | |
| System can accept a term comprised of all types of accepted expressions and symbols. | |
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| Term entered: | x+1 \* (-function(count) / sin(x^2)) - 2.4 + $n |
| Rules entered: | |
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| System will not accept a term that contains symbols outside of the accepted scope for an algebraic term. | |
| Graphical user interface, text, application  Description automatically generated | |

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| **FR 1.2** | |
| Term entered: | 1 |
| Rules entered: | |
| x+1 \* -(function(count) / sin(x^2)) - (2.4 \* 4) + $n = x+1 \* -(function(count) / sin(x^2)) - (2.4 \* 4) + $n | |
| A rule containing all possible symbols in valid algebraic syntax. System can run engine with given input (accepting rule as valid). | |
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| **FR 1.3** | |
| Term entered: |  |
| Rules entered: | |
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| Term can be types into the JTextArea as shown in screenshot | |
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| **FR 1.4** | |
| Term entered: | 1 |
| Rules entered: | |
| x = y  y = z  z = a | |
| Multiple rewrite rules can be entered into the system. | |
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| **FR 2.1** | |
| Term entered: | (x+x) – (x + x) |
| Rules entered: | |
| x = y | |
| Incremented rule application limit from 1-4 shows order of rule application from left to right. | |
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| **FR 2.2** | |
| Term entered: |  |
| Rules entered: | |
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| **FR 3.1** | |
| Term entered: | 1+(x+1 \* -(function(count) / sin(x^2)) - (2.4 \* 4)) |
| Rules entered: | |
| x+1 \* -(function(count) / sin(x^2)) - (2.4 \* 4) = z | |
| Complex term consisting of all operations and symbols is accurately matched to the entered rule. | |
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| **FR 3.2** | |
| Term entered: | (x+1) – (x+2) – (x+3) – (x+4) – (x+5) |
| Rules entered: | |
| x+1 = a  x+2 = b  x+3 = c  x+4 = d  x+5 = e | |
| The LHS of each rule entered matches a redex within the term. All rules being matched shows that all rules are considered by the matching process. | |
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| **FR 3.3** | |
| Term entered: | function(a, b, b) /a |
| Rules entered: | |
| function($x, $y, $y) / $x = 1 | |
| The rule variables in the rule correspond to the order of their corresponding nodes in the algebraic term. The rule should match | |
|  | |
| Term entered: | function(a, b, b), b |
| Rules entered: | |
| function($x, $y, $y) / $x = 1 | |
| The rule should not match, as the subtrees in the algebraic term that correspond to rule variable $x are not the same in every instance. | |
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| **FR 4.1** | |
| Term entered: | ((3/x) ^ -cos(y)\*tan(x+1)) + 7 |
| Rules entered: | |
| $x + 7 = 3 + $x + p | |
| A complex term matched to rule variable $x can be substituted correctly into | |
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| **FR 4.2** | |
| Term entered: | function(sin(x)^2, 2-(x/3)) |
| Rules entered: | |
| function($x, $y) = ($x \*$x) / ($y \* $x) | |
| Rule variables correspond with subtrees consisting of more than one node. These subtrees are successfully substituted into the RHS of the rule | |
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| **FR 5.1** | |
| Term entered: | x |
| Rules entered: | |
| x = q+(p-3) \* (r/s)^2 – sin(x) | |
| Transformed term containing all symbols can be output in the GUI. | |
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| **FR 5.2** | |
| Term entered: | (3/4 \* 5/3 + 1.5 – 2) ^-1 |
| Rules entered: | |
| None | |
| Once all rules are applied, operations between numbers are evaluated. | |
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| **FR 6.1** | |
| Term entered: | 1 |
| Rules entered: | |
| x + $A = y : \_is\_literal($A) | (\_is\_number($A) & !($A<0)) | |
| Rule containing all condition node types is accepted by the system. | |
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| **FR 6.2** | |
| Term entered: | 1 |
| Rules entered: | |
| $x +1 = y  $x = y : $x == sin(x)  $x = y : $x == p|  $x + 2 = z | |
| Rules can be processed if only some contain conditions. | |
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| **FR 6.3** | |
| Term entered: | x+1 |
| Rules entered: | |
| x + $A = y : \_is\_literal($A) | (\_is\_number($A) & !($A<0)) | |
| All types of condition nodes are present in the rule. $A represents a number which fulfils the criteria of both \_is\_number($A) and $A>0. | |
|  | |
| Term entered: | x+y |
| Rules entered: | |
| rule: x + $A = y : \_is\_number($A) & !($A<0) | \_is\_literal($A) | |
| $A represents a literal, which fulfils the OR operation’s LHS, evaluating to a true condition. | |
|  | |
| Term entered: | x+-1 |
| Rules entered: | |
| x + $A = y : \_is\_literal($A) | (\_is\_number($A) & !($A<0)) | |
| $A represents a number, but the number is not greater than zero. Conditions represent 0| (1&0) 🡪 0|0 🡪 0, therefore the rule cannot be applied. | |
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| **FR 7.1** |
| Screenshot of User Interface. |
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| **FR 7.2** |
| Screenshot of JFileChooser window after clicking on the ‘Load Rules’ button. |
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| **FR 7.3** |
| Screenshot of User Interface, space to enter term highlighted. |
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| **FR 7.4** | |
| Term entered: | chainSubtract(sin(x), 3000) |
| Rules entered: | |
| chainSubtract ($value, 0) = value  chainSubtract ($value, $count) = $value-chainSubtract($value, $count-1) : \_is\_integer($count) & $count > 0 | |
| A term representing the repeated subtraction of function *sin(x).*  Even if the term cannot be represented in the space allocated for the result, the use of JScrollPane allows for the whole term to be seen by the user. | |
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| **FR 8.1** | |
| Term entered: |  |
| Rules entered: | |
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| **FR 8.2** | |
| Term entered: |  |
| Rules entered: | |
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| **FR 8.3** | |
| Term entered: | Fib(10) |
| Rules entered: | |
| Fib(0) = 0  Fib(1) = 1  Fib($n) = fib($n-1) + fib($n-2) : \_is\_integer($n) & $n>1 | |
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