The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0

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To cite this version:

Thomas Durieux, Benjamin Danglot, Zhongxing Yu, Matias Martinez, Simon Urli, et al.. The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0. [Research Report] hal-01480084, Université Lille 1 - Sciences et Technologies. 2017. <hal-01480084>

HAL Id: hal-01480084
https://hal.archives-ouvertes.fr/hal-01480084
Submitted on 7 Mar 2017

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This report lists the test-suite adequate patches found by the Nopol automatic repair system [3] on version 1.1.0 of the Defects4J benchmark of bugs [2]. In total, Nopol finds a test-suite adequate patches for 103 different bugs, as shown in Table 1.

To refer to this document:

@techreport{techrepNopolDefects4j2017,
    TITLE = {{The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0}},
    AUTHOR = {Durieux, Thomas and Danglot, Benjamin and Yu, Zhongxing and Martinez, Matias and Monperrus, Martin},
    URL = {https://hal.archives-ouvertes.fr/hal-01480084},
    INSTITUTION = {{Université de Lille}},
    YEAR = {2017},
    NUMBER = {hal-01480084},
}

We the Oracle JDK 1.7.0_7 to run Nopol and OpenJDK 1.8.0 for compiling the project Mockito. We give a time budget of three hours to Nopol to find a patch. The experiment has been conducted on machines that are equipped of Xeon X3440 Quad-core processor and 15GB RAM, the machines are part of the Grid5000 infrastructure [1].

Reproduction information:

- Nopol source code: https://github.com/SpoonLabs/nopol/
  Commit used: 47396b4c2d5c668517bd45be1d878074858eb93d
- Defects4j version: https://github.com/rjust/defects4j/releases/tag/v1.1.0/
- Execution traces: https://github.com/Spirals-Team/defects4j-repair/tree/master/results/2017-march/

1 Chart

Nopol repairs 9 bugs in the project Chart.

1.1 Chart 3

--- /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
+++ /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
@@ -884,3 +884,3 @@
     }
-    if (removed) {
+    if (removed) {

Table 1: The number of synthesized test-suite adequate patches for each project.

<table>
<thead>
<tr>
<th>Project</th>
<th># Patches</th>
<th># Bugs</th>
<th>Repair Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chart</td>
<td>9</td>
<td>26</td>
<td>37%</td>
</tr>
<tr>
<td>Closure</td>
<td>56</td>
<td>133</td>
<td>42%</td>
</tr>
<tr>
<td>Lang</td>
<td>4</td>
<td>65</td>
<td>6%</td>
</tr>
<tr>
<td>Math</td>
<td>24</td>
<td>106</td>
<td>22%</td>
</tr>
<tr>
<td>Mockito</td>
<td>2</td>
<td>38</td>
<td>5%</td>
</tr>
<tr>
<td>Time</td>
<td>8</td>
<td>27</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>395</td>
<td>26%</td>
</tr>
</tbody>
</table>

Listing 1: "The generated patch for the bug Chart 3"

Number of tests that execute the patch: 86
Execution time: 50 seconds

1.2 Chart 4

```java
--- /tmp/chart_4_Nopol/source/org/jfree/chart/plot/XYPlot.java
+++ /tmp/chart_4_Nopol/source/org/jfree/chart/plot/XYPlot.java
@@ -1606,3 +1606,5 @@
public void setRenderer(XYItemRenderer renderer) {
   setRenderer(0, renderer);
+   if (renderer != null) {
+      setRenderer(0, renderer);
+   }
}
```

Listing 2: "The generated patch for the bug Chart 4"

Number of tests that execute the patch: 18
Execution time: 7 minutes, 32 seconds

1.3 Chart 5

```java
--- /tmp/chart_5_Nopol/source/org/jfree/data/xy/XYSeries.java
+++ /tmp/chart_5_Nopol/source/org/jfree/data/xy/XYSeries.java
@@ -562,3 +562,3 @@
       // append the value to the list...
       if (this.autoSort) {
           if (overwritten != null) {
```

Listing 3: "The generated patch for the bug Chart 5"

Number of tests that execute the patch: 6
Execution time: 38 seconds

1.4 Chart 9

```java
--- /tmp/chart_9_Nopol/source/org/jfree/data/time/TimeSeries.java
+++ /tmp/chart_9_Nopol/source/org/jfree/data/time/TimeSeries.java
@@ -882,3 +882,5 @@
   if (end < start) {
      throw new IllegalArgumentException("Requires start <= end.");
+     if (org.jfree.data.time.TimeSeries.this.data.size() == org.jfree.data.time.
               TimeSeries.this.range.length()) {
+      throw new IllegalArgumentException("Requires start <= end.");
+   }
```

Listing 4: "The generated patch for the bug Chart 9"

Number of tests that execute the patch: 4
Execution time: 34 seconds

1.5 Chart 13
1.6 Chart 17

Listing 6: "The generated patch for the bug Chart 17"

Number of tests that execute the patch: 4
Execution time: 33 seconds

1.7 Chart 21

Listing 7: "The generated patch for the bug Chart 21"

Number of tests that execute the patch: 12
Execution time: 37 seconds

1.8 Chart 25
1.9 Chart 26

Listing 8: "The generated patch for the bug Chart 25"

Number of tests that execute the patch: 10
Execution time: 33 seconds

1.9 Chart 26

Listing 9: "The generated patch for the bug Chart 26"

Number of tests that execute the patch: 48
Execution time: 1 minute, 40 seconds

2 Closure

Nopol repairs 56 bugs in the project Closure.

2.1 Closure 1

Listing 10: "The generated patch for the bug Closure 1"

Number of tests that execute the patch: 15
Execution time: 2 minutes, 4 seconds

2.2 Closure 2

Listing 11: "The generated patch for the bug Closure 2"

Number of tests that execute the patch: 17
Execution time: 2 minutes, 7 seconds

2.3 Closure 3
Listing 12: "The generated patch for the bug Closure 3"

Number of tests that execute the patch: 10
Execution time: 7 minutes, 8 seconds

2.4 Closure 5

Listing 13: "The generated patch for the bug Closure 5"

Number of tests that execute the patch: 8
Execution time: 1 minute, 51 seconds

2.5 Closure 7

Listing 14: "The generated patch for the bug Closure 7"

Number of tests that execute the patch: 358
Execution time: 3 minutes, 26 seconds

2.6 Closure 8
Listing 15: "The generated patch for the bug Closure 8"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 28 seconds

2.7 Closure 10

Listing 16: "The generated patch for the bug Closure 10"

Number of tests that execute the patch: 8
Execution time: 4 minutes, 28 seconds

2.8 Closure 12

Listing 17: "The generated patch for the bug Closure 12"

Number of tests that execute the patch: 8
Execution time: 7 minutes, 35 seconds

2.9 Closure 14

Listing 18: "The generated patch for the bug Closure 14"

Number of tests that execute the patch: 7
### 2.10 Closure 15

```java
--- /tmp/closure_15_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_15_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
        "\nTree1: " + toStringTree() +
-       "\nTree2: " + node2.toStringTree() +
+       "\nTree2: " + node2.toStringTree() +
        + "\nSubtree1: " + diff.nodeA.toStringTree() +
+       "\nSubtree1: " + diff.nodeA.toStringTree() +
        + "Subtree2: " + diff.nodeB.toStringTree();
    } else if (com.google.javascript.rhino.Node.this.type < 32) {
        return "Node tree inequality:" +
```

Listing 19: "The generated patch for the bug Closure 15"

Number of tests that execute the patch: 8

Execution time: 7 minutes, 28 seconds

### 2.11 Closure 16

```java
--- /tmp/closure_16_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_16_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1445,3 +1445,5 @@
    if (!isEquivalentTo(node2, false, false)) {
        return new NodeMismatch(this, node2);
    } else if (rValue.isOr()) {
```

Listing 20: "The generated patch for the bug Closure 16"

Number of tests that execute the patch: 12

Execution time: 4 minutes, 12 seconds

### 2.12 Closure 17

```java
--- /tmp/closure_17_Nopol/src/com/google/javascript/jscomp/TypedScopeCreator.java
+++ /tmp/closure_17_Nopol/src/com/google/javascript/jscomp/TypedScopeCreator.java
@@ -1294,3 +1294,5 @@
    // then we can safely use that.
    return rValue.getJSType();
    } else if (rValue.isOr()) {
```

Listing 21: "The generated patch for the bug Closure 17"

Number of tests that execute the patch: 25

Execution time: 2 minutes, 1 second

### 2.13 Closure 18

```java
--- /tmp/closure_18_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_18_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
        "\nTree1:\n" + toStringTree() +
```
Listing 22: "The generated patch for the bug Closure 18"

Number of tests that execute the patch: 8
Execution time: 1 minute, 51 seconds

2.14 Closure 20

--- /tmp/closure_20_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_20_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
     if (diff != null) {
-     return "Node tree inequality:" +
-     "\nTree1: \n" + toStringTree() +
-     "\nTree2: \n" + node2.toStringTree() +
-     "\nSubtree1: " + diff.nodeA.toStringTree() +
-     "\nSubtree2: " + diff.nodeB.toStringTree();
+     if (com.google.javascript.rhino.Node.this.type < 32) {
+     return "Node tree inequality:" +
+     "\nTree1: \n" + toStringTree() +
+     "\nTree2: \n" + node2.toStringTree() +
+     "\nSubtree1: " + diff.nodeA.toStringTree() +
+     "\nSubtree2: " + diff.nodeB.toStringTree();
     }
   }
}

Listing 23: "The generated patch for the bug Closure 20"

Number of tests that execute the patch: 8
Execution time: 2 minutes

2.15 Closure 21

--- /tmp/closure_21_Nopol/src/com/google/javascript/jscomp/CheckSideEffects.java
+++ /tmp/closure_21_Nopol/src/com/google/javascript/jscomp/CheckSideEffects.java
@@ -117,7 +117,9 @@
     if (n == parent.getLastChild()) {
       for (Node an : parent.getAncestors()) {
         int ancestorType = an.getType();
-         if (ancestorType == Token.COMMA) continue;
-         if (ancestorType != Token.EXPR_RESULT && ancestorType != Token.BLOCK) return;
-         else break;
+         if (com.google.javascript.jscomp.CheckSideEffects.PROTECTOR_FN.length() == 0) {
+           int ancestorType = an.getType();
+           if (ancestorType == Token.COMMA) continue;
+           if (ancestorType != Token.EXPR_RESULT && ancestorType != Token.BLOCK) return;
+           else break;
+         }
       }
   }
}

Listing 24: "The generated patch for the bug Closure 21"

Number of tests that execute the patch: 2
Execution time: 1 minute, 59 seconds

2.16 Closure 22

--- /tmp/closure_22_Nopol/src/com/google/javascript/jscomp/CheckSideEffects.java
+++ /tmp/closure_22_Nopol/src/com/google/javascript/jscomp/CheckSideEffects.java
@@ -115,6 +115,8 @@
     continue;
     if (ancestorType != Token.EXPR_RESULT && ancestorType != Token.BLOCK) 
     if (com.google.javascript.jscomp.CheckSideEffects.PROTECTOR_FN.length() == 0) {
+        if (ancestorType != Token.EXPR_RESULT && ancestorType != Token.BLOCK) 
+          return;
     - else 
     - else 
     + }
   
Listing 25: "The generated patch for the bug Closure 22"

Number of tests that execute the patch: 3
2.17 Closure 26

Listing 26: "The generated patch for the bug Closure 26"

Number of tests that execute the patch: 14
Execution time: 3 minutes, 34 seconds

2.18 Closure 28

Listing 27: "The generated patch for the bug Closure 28"

Number of tests that execute the patch: 8
Execution time: 1 minute, 55 seconds

2.19 Closure 29

Listing 28: "The generated patch for the bug Closure 29"

Number of tests that execute the patch: 12
Execution time: 2 minutes

2.20 Closure 30
Listing 29: "The generated patch for the bug Closure 30"

Number of tests that execute the patch: 5
Execution time: 1 minute, 45 seconds

2.21 Closure 31

Listing 30: "The generated patch for the bug Closure 31"

Number of tests that execute the patch: 3
Execution time: 1 minute, 54 seconds

2.22 Closure 33

Listing 31: "The generated patch for the bug Closure 33"

Number of tests that execute the patch: 8
Execution time: 1 minute, 52 seconds

2.23 Closure 35
if ((fieldName.length()) != (5)) {
    if (builder.addProperty(fieldName, fieldType, fieldNameNode) == null) {
        // Duplicate field name, warning and skip
        reporter.warning("Duplicate record field " + fieldName,
            sourceName,
            n.getLineno(), fieldNameNode.getCharno());
    }
}

Listing 32: "The generated patch for the bug Closure 35"

Number of tests that execute the patch: 26
Execution time: 2 minutes, 43 seconds

2.24 Closure 36

--- /tmp/closure_36_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_36_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1416,-7 +1416,9 @@
if (diff != null) {
    return "Node tree inequality:" +
    "\nTree1:\n" + toStringTree() +
    "\nTree2:\n" + node2.toStringTree() +
    "\nSubtree1: " + diff.nodeA.toStringTree() +
    "\nSubtree2: " + diff.nodeB.toStringTree();
+ if (com.google/javascript.rhino.Node.this.type <= com.googlejavascript.rhino.Node.IS_DISPATCHER) {
+     return "Node tree inequality:" +
+     "\nTree1:\n" + toStringTree() +
+     "\nTree2:\n" + node2.toStringTree() +
+     "\nSubtree1: " + diff.nodeA.toStringTree() +
+     "\nSubtree2: " + diff.nodeB.toStringTree();
+ }
}

Listing 33: "The generated patch for the bug Closure 36"

Number of tests that execute the patch: 3
Execution time: 1 minute, 48 seconds

2.25 Closure 38

--- /tmp/closure_38_Nopol/src/com/google/javascript/jscomp/CodeConsumer.java
+++ /tmp/closure_38_Nopol/src/com/google/javascript/jscomp/CodeConsumer.java
@@ -244,-3 +244,3 @@
    boolean negativeZero = isNegativeZero(x);
    if (x < 0 && prev == '-') {
        if ((prev == 'e')) {
+            add(" ");
    }

Listing 34: "The generated patch for the bug Closure 38"

Number of tests that execute the patch: 1665
Execution time: 3 minutes, 11 seconds

2.26 Closure 40

--- /tmp/closure_40_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_40_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1411,-7 +1411,9 @@
if (diff != null) {
    return "Node tree inequality:" +
    "\nTree1:\n" + toStringTree() +
    "\nTree2:\n" + node2.toStringTree() +
    "\nSubtree1: " + diff.nodeA.toStringTree() +
    "\nSubtree2: " + diff.nodeB.toStringTree();
+ if (com.google/javascript.rhino.Node.this.type < 32) {
+     return "Node tree inequality:" +
+     "\nTree1:\n" + toStringTree() +
+     "\nTree2:\n" + node2.toStringTree() +
+     "\nSubtree1: " + diff.nodeA.toStringTree() +
+     "\nSubtree2: " + diff.nodeB.toStringTree();
+ }
}

Listing 35: "The generated patch for the bug Closure 40"
Number of tests that execute the patch: 3
Execution time: 2 minutes, 7 seconds

2.27 Closure 45

Listing 36: "The generated patch for the bug Closure 45"

Number of tests that execute the patch: 3
Execution time: 1 minute, 41 seconds

2.28 Closure 49

Listing 37: "The generated patch for the bug Closure 49"

Number of tests that execute the patch: 68
Execution time: 1 minute, 47 seconds

2.29 Closure 50

Listing 38: "The generated patch for the bug Closure 50"

Number of tests that execute the patch: 4
Execution time: 1 minute, 50 seconds

2.30 Closure 55
// reductions if doing so will result in some savings.
- if (savings > (helperCodeCost + SAVINGS_THRESHOLD)) {
-     for (Reduction reduction : reductions) {
-         reduction.apply();
-     }
- }
+ if ((1) != (reductions.size())) && (!(reducers.size() < reductions.size())) {
+     if (savings > (helperCodeCost + SAVINGS_THRESHOLD)) {
+         for (Reduction reduction : reductions) {
+             reduction.apply();
+         }
+         Node addingRoot = compiler.getNodeForCodeInsertion(null);
+         addingRoot.addChildrenToFront(helperCode);
+         compiler.reportCodeChange();
+     }
+     Node addingRoot = compiler.getNodeForCodeInsertion(null);
+     addingRoot.addChildrenToFront(helperCode);
+     compiler.reportCodeChange();
- }
-
- Node addingRoot = compiler.getNodeForCodeInsertion(null);
- addingRoot.addChildrenToFront(helperCode);
- compiler.reportCodeChange();
}

Listing 39: "The generated patch for the bug Closure 55"

Number of tests that execute the patch: 11
Execution time: 2 minutes, 14 seconds

2.31 Closure 60

--- /tmp/closure_60_Nopol/src/com/google/javascript/jscomp/PeepholeSubstituteAlternateSyntax.java
+++ /tmp/closure_60_Nopol/src/com/google/javascript/jscomp/PeepholeSubstituteAlternateSyntax.java
@@ -1196,3 +1196,5 @@
         if (! newNode.isEquivalentTo(n)) {
-             parent.replaceChild(n, newNode);
+             if (com.google.javascript.jscomp.PeepholeSubstituteAlternateSyntax.this.late) {
+                 parent.replaceChild(n, newNode);
+             }
+             reportCodeChange();
         }
}

Listing 40: "The generated patch for the bug Closure 60"

Number of tests that execute the patch: 31
Execution time: 12 minutes, 12 seconds

2.32 Closure 61

--- /tmp/closure_61_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_61_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1460,7 +1460,9 @@
         if ((com.google.javascript.jscomp.rhino.Node.this.type) != (node2.type)) {
             return "Node tree inequality:" + 
                 "\nTree1:\" + toStringTree() + 
                 "\nSubtree2:\" + diff.nodeB.toStringTree();
         }
+     if (diff != null) {
+         return "Node tree inequality:" + 
+             "\nTree1:\" + toStringTree() + 
+             "\nSubtree2:\" + diff.nodeB.toStringTree();
+     }
}

Listing 41: "The generated patch for the bug Closure 61"

Number of tests that execute the patch: 4
Execution time: 1 minute, 39 seconds

2.33 Closure 62

--- /tmp/closure_62_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
+++ /tmp/closure_62_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
@@ -96,4 +96,3 @@
         if (excerpt.equals(LINE)) {
             // at the end of the line
             if (excerpt.equals(LINE)) {
-                 && 0 <= charno && charno < sourceExcerpt.length()) {
+                 && 0 <= charno && charno < sourceExcerpt.length()) {
}
2.34 Closure 63

Listing 43: "The generated patch for the bug Closure 63"

Number of tests that execute the patch: 5
Execution time: 1 minute, 31 seconds

2.35 Closure 66

Listing 44: "The generated patch for the bug Closure 66"

Number of tests that execute the patch: 166
Execution time: 2 minutes, 21 seconds

2.36 Closure 67

Listing 45: "The generated patch for the bug Closure 67"

Number of tests that execute the patch: 2
Execution time: 1 minute, 37 seconds

2.37 Closure 72
Listing 46: "The generated patch for the bug Closure 72"

Number of tests that execute the patch: 2
Execution time: 1 minute, 32 seconds

2.38 Closure 75

--- /tmp/closure_75_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_75_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1410 ,3 +1410 ,5 @@

- res = n. checkTreeEqualsImpl(n2);
this.first.getType()) {
+ res = n. checkTreeEqualsImpl(n2);
+ }

if ( res != null ) {

Listing 47: "The generated patch for the bug Closure 75"

Number of tests that execute the patch: 3164
Execution time: 24 minutes, 1 second

2.39 Closure 76

--- /tmp/closure_76_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_76_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1368 ,7 +1368 ,9 @@

if ( diff != null ) {
- return "Node tree inequality:"
- "\nTree1:"
+ if (node2.type < com.google.javascript.rhino.Node.FUNCTION_PROP) {
+ return "Node tree inequality:"
+ "\nTree1:"
+ "\nTree2:"
+ "\nSubtree1:"
+ "\nSubtree2:"
+ "\nSubtree1:"
+ "\nSubtree2:"
+ }

Listing 48: "The generated patch for the bug Closure 76"

Number of tests that execute the patch: 5
Execution time: 1 minute, 30 seconds

2.40 Closure 78

--- /tmp/closure_78_Nopol/src/com/google/javascript/jscomp/PeepholeFoldConstants.java
+++ /tmp/closure_78_Nopol/src/com/google/javascript/jscomp/PeepholeFoldConstants.java
@@ -717 ,3 +717 ,5 @@

if ( rval == 0 ) {
- error(DiagnosticType.error("JSC_DIVIDE_BY_0_ERROR", "Divide by 0"), right);
+ if (53 == 0) {
+ error(DiagnosticType.error("JSC_DIVIDE_BY_0_ERROR", "Divide by 0"), right);
+ }

return null;

Listing 49: "The generated patch for the bug Closure 78"

Number of tests that execute the patch: 1
Execution time: 1 minute, 25 seconds

2.41 Closure 111

--- /tmp/closure_111_Nopol/src/com/google/javascript/rhino/testing/Asserts.java
+++ /tmp/closure_111_Nopol/src/com/google/javascript/rhino/testing/Asserts.java
@@ -102 ,3 +102 ,3 @@

(a == null) == (b == null));
- if (a == null) {
+ if (a == null) {

15
Listing 50: "The generated patch for the bug Closure 111"
Number of tests that execute the patch: 381
Execution time: 2 minutes, 49 seconds

2.42 Closure 113

Listing 51: "The generated patch for the bug Closure 113"
Number of tests that execute the patch: 26
Execution time: 2 minutes, 22 seconds

2.43 Closure 114

Listing 52: "The generated patch for the bug Closure 114"
Number of tests that execute the patch: 8
Execution time: 2 minutes, 14 seconds

2.44 Closure 115

Listing 53: "The generated patch for the bug Closure 115"
Number of tests that execute the patch: 14
Execution time: 2 minutes, 18 seconds

2.45 Closure 116
Listing 54: "The generated patch for the bug Closure 116"

Number of tests that execute the patch: 13
Execution time: 2 minutes, 13 seconds

Listing 55: "The generated patch for the bug Closure 119"

Number of tests that execute the patch: 394
Execution time: 32 minutes, 2 seconds

Listing 56: "The generated patch for the bug Closure 120"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 11 seconds
Listing 57: "The generated patch for the bug Closure 121"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 12 seconds

2.49 Closure 124

--- /tmp/closure_124_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_124_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1427,7 +1427,9 @@
    if ( diff != null ) {
        return "Node tree inequality:" +
            "\nTree1:\n" + toStringTree() +
-        "\nTree2:\n" + node2.toStringTree() +
-        "\nSubtree1: " + diff.nodeA.toStringTree() +
-        "\nSubtree2: " + diff.nodeB.toStringTree();
+        if ( node2.type < com.google.javascript.rhino.Node.SIDE_EFFECT_FLAGS ) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\nTree2:\n" + node2.toStringTree() +
+                "\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\nSubtree2: " + diff.nodeB.toStringTree();
    }
}

Listing 58: "The generated patch for the bug Closure 124"

Number of tests that execute the patch: 8
Execution time: 17 minutes, 49 seconds

2.50 Closure 126

--- /tmp/closure_126_Nopol/src/com/google/javascript/jscomp/MinimizeExitPoints.java
+++ /tmp/closure_126_Nopol/src/com/google/javascript/jscomp/MinimizeExitPoints.java
@@ -142,3 +142,5 @@
    Node finallyBlock = n.getLastChild();
    tryMinimizeExits(finallyBlock, exitType, labelName);
+    if (0 == 1) {
+        tryMinimizeExits(finallyBlock, exitType, labelName);
+    }
}

Listing 59: "The generated patch for the bug Closure 126"

Number of tests that execute the patch: 2
Execution time: 2 minutes, 1 second

2.51 Closure 127

--- /tmp/closure_127_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_127_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1427,7 +1427,9 @@
    if ( diff != null ) {
        return "Node tree inequality:" +
            "\nTree1:\n" + toStringTree() +
-        "\nTree2:\n" + node2.toStringTree() +
-        "\nSubtree1: " + diff.nodeA.toStringTree() +
-        "\nSubtree2: " + diff.nodeB.toStringTree();
+        if ( node2.type < com.google.javascript.rhino.Node.SIDE_EFFECT_FLAGS ) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\nTree2:\n" + node2.toStringTree() +
+                "\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\nSubtree2: " + diff.nodeB.toStringTree();
    }
}

Listing 60: "The generated patch for the bug Closure 127"

Number of tests that execute the patch: 13
Execution time: 2 minutes, 4 seconds

2.52 Closure 129
Listing 61: "The generated patch for the bug Closure 129"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 18 seconds

2.53 Closure 130

Listing 62: "The generated patch for the bug Closure 130"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 3 seconds

2.54 Closure 131

Listing 63: "The generated patch for the bug Closure 131"

Number of tests that execute the patch: 9
Execution time: 2 minutes, 21 seconds

2.55 Closure 132
if (diff != null) {
    return "Node tree inequality:
    Tree1:
    Tree2:
    Subtree1: " + diff.nodeA.toStringTree() +
    Subtree2: " + diff.nodeB.toStringTree();
}

if (com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.INFERRED_FUNCTION) {
    return "Node tree inequality:
    Tree1:
    Tree2:
    Subtree1: " + diff.nodeA.toStringTree() +
    Subtree2: " + diff.nodeB.toStringTree();
}

Listing 64: "The generated patch for the bug Closure 132"

Number of tests that execute the patch: 8
Execution time: 2 minutes, 25 seconds

2.56 Closure 133

--- /tmp/closure_133_Nopol/src/com/google/javascript/jscomp/parsing/JsDocInfoParser.java
+++ /tmp/closure_133_Nopol/src/com/google/javascript/jscomp/parsing/JsDocInfoParser.java
@@ -1412,4 +1412,3 @@
    if (token == JsDocToken.EOC || token == JsDocToken.EOL ||
    token == JsDocToken.EOF) {
+    if (com.google.javascript.jscomp.parsing.JsDocInfoParser.this.unreadToken != null) {
        return new ExtractionInfo("", token);
    }

Listing 65: "The generated patch for the bug Closure 133"

Number of tests that execute the patch: 254
Execution time: 4 minutes, 22 seconds

3  Lang

Nopol repairs 4 bugs in the project Lang.

3.1 Lang 44

--- /tmp/lang_44_Nopol/src/java/org/apache/commons/lang/NumberUtils.java
+++ /tmp/lang_44_Nopol/src/java/org/apache/commons/lang/NumberUtils.java
@@ -192,5 +192,3 @@
    case 'L':
    - if (dec == null
    - && exp == null
    - && (numeric.charAt(0) == '-' && isDigits(numeric.substring(1)) ||
    + if (((dec == null) && (exp == null)) {
        try {
    @@ -201,3 +199,3 @@
          return createBigInteger(numeric);
        -
        +
    }

Listing 66: "The generated patch for the bug Lang 44"

Number of tests that execute the patch: 3
Execution time: 29 seconds

3.2 Lang 51

--- /tmp/lang_51_Nopol/src/java/org/apache/commons/lang/BooleanUtils.java
+++ /tmp/lang_51_Nopol/src/java/org/apache/commons/lang/BooleanUtils.java
@@ -676,6 +676,6 @@
    }
    if (ch == 'Y') {
        return
    - (str.charAt(1) == 'E' || str.charAt(1) == 'e') &&
    - (str.charAt(2) == 'S' || str.charAt(2) == 's');
+    if (!str.equals("E" | str.charAt(1) == 'e') &&

3.3 Lang 53

```java
--- /tmp/lang_53_Nopol/src/java/org/apache/commons/lang/time/DateUtils.java
+++ /tmp/lang_53_Nopol/src/java/org/apache/commons/lang/time/DateUtils.java
@@ -665,3 +665,5 @@
     DateUtils
   }
```  
Listing 68: "The generated patch for the bug Lang 53"

Number of tests that execute the patch: 6  
Execution time: 35 seconds

3.4 Lang 58

```java
--- /tmp/lang_58_Nopol/src/java/org/apache/commons/lang/math/NumberUtils.java
+++ /tmp/lang_58_Nopol/src/java/org/apache/commons/lang/math/NumberUtils.java
@@ -451,6 +451,3 @@
   case 'L':
   - if (dec == null
     - && exp == null
     - && isDigits(numeric.substring(1))
     - && (numeric.charAt(0) == '.' || Character.isDigit(numeric.charAt(0))))
     + if (((dec == null) && (exp == null)))
     + try {
       @@ -461,3 +458,3 @@
         return createBigInteger(numeric);
   +
   +
```  
Listing 69: "The generated patch for the bug Lang 58"

Number of tests that execute the patch: 3  
Execution time: 10 minutes, 26 seconds

4 Math

Nopol repairs 24 bugs in the project Math.

4.1 Math 2

```java
--- /tmp/math_2_Nopol/src/main/java/org/apache/commons/math3/distribution/
   AbstractIntegerDistribution.java
+++ /tmp/math_2_Nopol/src/main/java/org/apache/commons/math3/distribution/
   AbstractIntegerDistribution.java
@@ -137,3 +137,5 @@
    if (tmp < upper) {
      - if (tmp == -1) {
      + if (tmp == -1) {
      +    upper = ((int) Math.ceil(tmp)) - 1;
      + }
      ```  
Listing 70: "The generated patch for the bug Math 2"

Number of tests that execute the patch: 63  
Execution time: 6 minutes, 18 seconds

4.2 Math 4
Listing 71: "The generated patch for the bug Math 4"

Number of tests that execute the patch: 24
Execution time: 6 minutes, 7 seconds

4.3 Math 7

Listing 72: "The generated patch for the bug Math 7"

Number of tests that execute the patch: 14
Execution time: 20 minutes, 6 seconds

4.4 Math 24

Listing 73: "The generated patch for the bug Math 24"

Number of tests that execute the patch: 2
Execution time: 9 minutes, 53 seconds

4.5 Math 28

Listing 74: "The generated patch for the bug Math 28"

Number of tests that execute the patch: 4
Execution time: 10 minutes, 31 seconds

4.6 Math 33
if (org.apache.commons.math3.optimization.linear.SimplexTableau.this.numSlackVariables < org.apache.commons.math3.optimization.linear.SimplexTableau.this.constraints.size()) {
    columnsToDrop.add(i);
}

Listing 75: "The generated patch for the bug Math 33"

Number of tests that execute the patch: 5
Execution time: 9 minutes, 59 seconds

4.7 Math 39

+++ /tmp/math_39_Nopol/src/main/java/org/apache/commons/math/ode/nonstiff/AdaptiveStepsizeIntegrator.java
@@ -263,3 +263,5 @@
this.maxStep)) {
    yDotOnScale2 += ratio * ratio;
"The generated patch for the bug Math 39"

Number of tests that execute the patch: 101
Execution time: 6 minutes, 49 seconds

4.8 Math 40

--- /tmp/math_40_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BracketingNthOrderBrentSolver.java
+++ /tmp/math_40_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BracketingNthOrderBrentSolver.java
@@ -259,3 +259,3 @@
    // we have more points before the sign change, drop the lowest point
Listing 77: "The generated patch for the bug Math 40"

Number of tests that execute the patch: 19
Execution time: 10 minutes, 33 seconds

4.9 Math 41

--- /tmp/math_41_Nopol/src/main/java/org/apache/commons/math/stat/descriptive/moment/Mean.java
+++ /tmp/math_41_Nopol/src/main/java/org/apache/commons/math/stat/descriptive/moment/Mean.java
@@ -216,3 +216,5 @@
    return xbarw + (correction/sumw);
+    if (xbarw < length) {
+        return xbarw + (correction/sumw);
+    }
Listing 78: "The generated patch for the bug Math 41"

Number of tests that execute the patch: 6
Execution time: 4 minutes, 31 seconds

4.10 Math 42

--- /tmp/math_42_Nopol/src/main/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
+++ /tmp/math_42_Nopol/src/main/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
@@ -346,3 +346,5 @@
    columnsToDrop.add(col);
+    if (1 <= org.apache.commons.math.optimization.linear.SimplexTableau.this.numSlackVariables) {
+        columnsToDrop.add(col);
Listing 79: "The generated patch for the bug Math 42"

Number of tests that execute the patch: 9
Execution time: 12 minutes, 59 seconds
Listing 79: "The generated patch for the bug Math 42"

Number of tests that execute the patch: 16
Execution time: 4 minutes, 39 seconds

4.11 Math 44

--- /tmp/math_44_Nopol/src/main/java/org/apache/commons/math/ode/AbstractIntegrator.java
+++ /tmp/math_44_Nopol/src/main/java/org/apache/commons/math/ode/AbstractIntegrator.java
@@ -286,3 +286,5 @@
- statesInitialized = true;
+ if (1 == org.apache.commons.math.ode.AbstractIntegrator.this.stepHandlers.size)
+ statesInitialized = true;
+ }
+

Listing 80: "The generated patch for the bug Math 44"

Number of tests that execute the patch: 137
Execution time: 7 minutes, 10 seconds

4.12 Math 49

--- /tmp/math_49_Nopol/src/main/java/org/apache/commons/math/linear/OpenMapRealVector.java
+++ /tmp/math_49_Nopol/src/main/java/org/apache/commons/math/linear/OpenMapRealVector.java
@@ -666,3 +666,5 @@
 } else if (entries.containsKey(index)) {
- entries.remove(index);
+ if (org.apache.commons.math.linear.OpenMapRealVector.DEFAULT_ZERO_TOLERANCE == org.
. apache.commons.math.linear.OpenMapRealVector.this.epsilon) {
+ entries.remove(index);
+ }
 }

Listing 81: "The generated patch for the bug Math 49"

Number of tests that execute the patch: 3
Execution time: 3 minutes, 18 seconds

4.13 Math 50

--- /tmp/math_50_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BaseSecantSolver.java
+++ /tmp/math_50_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BaseSecantSolver.java
@@ -236,15 +236,17 @@ atol)) {
- switch (allowed) {
- case ANY_SIDE:
- return x1;
- case LEFT_SIDE:
- return inverted ? x1 : x0;
- case RIGHT_SIDE:
- return inverted ? x0 : x1;
- case BELOW_SIDE:
- return (f1 <= 0) ? x1 : x0;
- case ABOVE_SIDE:
- return (f1 >= 0) ? x1 : x0;
- default:
- throw new MathInternalError();
+ this.method != null)) || (f0 <= atol)) {
+ switch (allowed) {
+ case ANY_SIDE:
+ return x1;
+ case LEFT_SIDE:
+ return inverted ? x1 : x0;
+ case RIGHT_SIDE:
+ return inverted ? x0 : x1;
+ case BELOW_SIDE:
+ return (f1 <= 0) ? x1 : x0;
+ case ABOVE_SIDE:
+ return (f1 >= 0) ? x1 : x0;
+ default:
Listing 82: "The generated patch for the bug Math 50"

Number of tests that execute the patch: 21
Execution time: 8 minutes, 22 seconds

4.14 Math 57

Listing 83: "The generated patch for the bug Math 57"

Number of tests that execute the patch: 5
Execution time: 3 minutes, 10 seconds

4.15 Math 58

Listing 84: "The generated patch for the bug Math 58"

Number of tests that execute the patch: 10
Execution time: 2 minutes, 54 seconds

4.16 Math 69

Listing 85: "The generated patch for the bug Math 69"

Number of tests that execute the patch: 11
Execution time: 33 seconds

4.17 Math 73
Listing 86: "The generated patch for the bug Math 73"

Number of tests that execute the patch: 5
Execution time: 34 seconds

4.18 Math 78

Listing 87: "The generated patch for the bug Math 78"

Number of tests that execute the patch: 116
Execution time: 15 minutes, 41 seconds

4.19 Math 80

Listing 88: "The generated patch for the bug Math 80"

Number of tests that execute the patch: 1
Execution time: 39 seconds

4.20 Math 81

Listing 89: "The generated patch for the bug Math 81"

Number of tests that execute the patch: 4
Execution time: 40 seconds

4.21 Math 85
if (fa * fb >= 0.0) {
  if (maximumIterations == initial) {
    throw new ConvergenceException(
      "number of iterations={0}, maximum iterations={1}, " +
      "initial={2}, lower bound={3}, upper bound={4}, final a value={5}, " +
      "final b value={6}, f(a)={7}, f(b)={8}" ,
      numIterations, maximumIterations, initial,
      lowerBound, upperBound, a, b, fa, fb);
  }
}
Listing 90: "The generated patch for the bug Math 85"

Number of tests that execute the patch: 17
Execution time: 37 seconds

4.22 Math 87

--- /tmp/math_87_Nopol/src/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
+++ /tmp/math_87_Nopol/src/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
@@ -160,4 +160,6 @@
    if (! restrictToNonNegative) {
      matrix[row][getSlackVariableOffset() - 1] =
        if (1) != (constraints.size()) {
+          matrix[row][getSlackVariableOffset() - 1] =
+            getInvertedCoefficientSum(constraint.getCoefficients());
+        }
    }

Listing 91: "The generated patch for the bug Math 87"

Number of tests that execute the patch: 12
Execution time: 50 seconds

4.23 Math 88

--- /tmp/math_88_Nopol/src/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
+++ /tmp/math_88_Nopol/src/java/org/apache/commons/math/optimization/linear/SimplexTableau.java
@@ -338,3 +338,5 @@
      if (tableau.getEntry(basicRow, j) == 1) {
        coefficients[i] = 0;
        if (org.apache.commons.math.optimization.linear.SimplexTableau.this.
+          constraints.size() < org.apache.commons.math.optimization.linear.SimplexTableau.this.
+            numDecisionVariables) {
+            coefficients[i] = 0;
+          }
      }
}

Listing 92: "The generated patch for the bug Math 88"

Number of tests that execute the patch: 3
Execution time: 23 seconds

4.24 Math 105

--- /tmp/math_105_Nopol/src/java/org/apache/commons/math/stat/regression/SimpleRegression.java
+++ /tmp/math_105_Nopol/src/java/org/apache/commons/math/stat/regression/SimpleRegression.java
@@ -107,3 +107,5 @@
      xbar = x;
      ybar = y;
      if (y <= x) {
+        ybar = y;
      }
    }
  } else {
Listing 93: "The generated patch for the bug Math 105"

Number of tests that execute the patch: 9
Execution time: 35 seconds

5 Mockito

Nopol repairs 2 bugs in the project Mockito.
5.1 Mockito 29

Listing 94: "The generated patch for the bug Mockito 29"

Number of tests that execute the patch: 5
Execution time: 18 seconds

5.2 Mockito 38

Listing 95: "The generated patch for the bug Mockito 38"

Number of tests that execute the patch: 173
Execution time: 3 minutes, 12 seconds

6 Time

Nopol repairs 8 bugs in the project Time.

6.1 Time 4

Listing 96: "The generated patch for the bug Time 4"

Number of tests that execute the patch: 75
Execution time: 56 seconds

6.2 Time 7

Listing 97: "The generated patch for the bug Time 7"

Number of tests that execute the patch: 84
Execution time: 43 seconds

6.3 Time 11
Listing 98: "The generated patch for the bug Time 11"

Number of tests that execute the patch: 18
Execution time: 53 seconds

6.4 Time 12

Listing 99: "The generated patch for the bug Time 12"

Number of tests that execute the patch: 159
Execution time: 1 minute, 29 seconds

6.5 Time 14

Listing 100: "The generated patch for the bug Time 14"

Number of tests that execute the patch: 63
Execution time: 37 seconds

6.6 Time 16
Listing 101: "The generated patch for the bug Time 16"

Number of tests that execute the patch: 54
Execution time: 40 seconds

6.7 Time 18

Listing 102: "The generated patch for the bug Time 18"

Number of tests that execute the patch: 3456
Execution time: 7 minutes, 48 seconds

6.8 Time 19

Listing 103: "The generated patch for the bug Time 19"

Number of tests that execute the patch: 2139
Execution time: 3 minutes, 24 seconds

References

