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

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

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Technical report hal-01480084

https://hal.archives-ouvertes.fr/hal-01480084

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.

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We use the Oracle JDK 1.7.0_7 or 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: 473964c2d5c668517bd45be1d878074858eb934f
- 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 @@
     } else if (removed) {
         if (null) {
             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><strong>Total</strong></td>
<td><strong>103</strong></td>
<td><strong>395</strong></td>
<td><strong>26%</strong></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

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

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

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

Number of tests that execute the patch: 2
Execution time: 42 seconds

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

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

2.7 Closure 10

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

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

2.8 Closure 12

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

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

2.9 Closure 14

Number of tests that execute the patch: 7

Listing 18: "The generated patch for the bug Closure 14"
Execution time: 3 minutes, 2 seconds

2.10 Closure 15

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

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

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

2.14 Closure 20

Listing 22: "The generated patch for the bug Closure 18"

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

2.15 Closure 21

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

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

2.16 Closure 22

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

Number of tests that execute the patch: 3
Execution time: 2 minutes, 24 seconds

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.google/javascript.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/ir/CodeConsumer.java
+++ /tmp/closure_38_Nopol/src/com/google/javascript/ir/CodeConsumer.java
@@ -244,3 +244,3 @@
  boolean negativeZero = isNegativeZero(x);
- if (x < 0 && prev == '-') {
+ if ((prev == '-')) {
    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.jsr305.ir.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

```java
--- /tmp/closure_45_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_45_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1403,7 +1403,9 @@
     if (diff != null) {
         return "Node tree inequality:" +
             "\nTree1:\n" + toStringTree() +
-        "\n\nTree2:\n" + node2.toStringTree() +
        "\n\nSubtree1: " + diff.nodeA.toStringTree() +
        "\n\nSubtree2: " + diff.nodeB.toStringTree();
+        if (com.google.javascript.rhino.Node.this.type < 32) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\n\nTree2:\n" + node2.toStringTree() +
+                "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\n\nSubtree2: " + diff.nodeB.toStringTree();
+        }
     }
```

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

```java
--- /tmp/closure_49_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_49_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1566,7 +1566,9 @@
     if (diff != null) {
         return "Node tree inequality:" +
             "\nTree1:\n" + toStringTree() +
-        "\n\nTree2:\n" + node2.toStringTree() +
        "\n\nSubtree1: " + diff.nodeA.toStringTree() +
        "\n\nSubtree2: " + diff.nodeB.toStringTree();
+        if (com.google.javascript.rhino.Node.this.type < 29) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\n\nTree2:\n" + node2.toStringTree() +
+                "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\n\nSubtree2: " + diff.nodeB.toStringTree();
+        }
     }
```

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

```java
--- /tmp/closure_50_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_50_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1566,7 +1566,9 @@
     if (diff != null) {
         return "Node tree inequality:" +
             "\nTree1:\n" + toStringTree() +
-        "\n\nTree2:\n" + node2.toStringTree() +
        "\n\nSubtree1: " + diff.nodeA.toStringTree() +
        "\n\nSubtree2: " + diff.nodeB.toStringTree();
+            LABEL_PROP) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\n\nTree2:\n" + node2.toStringTree() +
+                "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\n\nSubtree2: " + diff.nodeB.toStringTree();
+        }
     }
```

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

2.31 Closure 60

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

2.32 Closure 61

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

2.33 Closure 62
Listing 42: "The generated patch for the bug Closure 62"

Number of tests that execute the patch: 5
Execution time: 1 minute, 32 seconds

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
2.38 Closure 75

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

2.39 Closure 76

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

2.40 Closure 78

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

2.41 Closure 111

Number of tests that execute the patch: 1
Execution time: 1 minute, 25 seconds
if (message != null) {
    return;
}

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
--- /tmp/closure_113_Nopol/src/com/google/javascript/jscomp/ProcessClosurePrimitives.java
+++ /tmp/closure_113_Nopol/src/com/google/javascript/jscomp/ProcessClosurePrimitives.java
@@ -328,3 +328,3 @@
    // let them be caught in the subsequent run.
    if (provided != null) {
        +if ((provided != null) || ((ns.length() < 10))) {
            parent.detachFromParent();
        }

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
--- /tmp/closure_114_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_114_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    +if (node2.type < com.google.javascript.rhino.Node.JSDOC_INFO_PROP) {
            return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    }
}

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
--- /tmp/closure_115_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_115_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    +if (node2.type < com.google.javascript.rhino.Node.JSDOC_INFO_PROP) {
            return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    }
}

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
--- /tmp/closure_116_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_116_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
    if (diff != null) {
        return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    +if (node2.type < com.google.javascript.rhino.Node.JSDOC_INFO_PROP) {
            return "Node tree inequality:" +
                "\nTree1:" + toStringTree() +
                "\nTree2:" + node2.toStringTree() +
                "\nSubtree1:" + diff.nodeA.toStringTree() +
                "\nSubtree2:" + diff.nodeB.toStringTree();
    }

Listing 54: "The generated patch for the bug 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

2.46 Closure 119

--- /tmp/closure_119_Nopol/src/com/google/javascript/jscomp/GlobalNamespace.java
+++ /tmp/closure_119_Nopol/src/com/google/javascript/jscomp/GlobalNamespace.java
@@ -690,3 +690,5 @@
- handleGet(module, scope, n, parent, name, type);
+ if (((com.google.jscomp.GlobalNamespace.this.externsRoot != null) && ((-1) !=
+ ((2) - (com.google.jscomp.GlobalNamespace.this.globalNames.size()))) || (!((com.
+ google.jscomp.GlobalNamespace.this.externsScope != null))) {  
+ handleGet(module, scope, n, parent, name, type);
+ }
+

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

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

2.47 Closure 120

--- /tmp/closure_120_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_120_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
- if (diff != null) {
-     return "Node tree inequality:" +
-     "\n\nTree1:\n" + toStringTree() +
-     "\n\nTree2:\n" + node2.toStringTree() +
-     "\n\nSubtree1: " + diff.nodeA.toStringTree() +
-     "\n\nSubtree2: " + diff.nodeB.toStringTree();
+ if (node2.type < com.google.jscomp.Rhino.Node.JSDOC_INFO_PROP) {
+     return "Node tree inequality:" +
+     "\nTree1:\n" + toStringTree() +
+     "\nTree2:\n" + node2.toStringTree() +
+     "\nSubtree1: " + diff.nodeA.toStringTree() +
+     "\nSubtree2: " + diff.nodeB.toStringTree();
+ }
+

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

Number of tests that execute the patch: 8
Execution time: 2 minutes, 11 seconds

2.48 Closure 121

--- /tmp/closure_121_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_121_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1429,7 +1429,9 @@
- if (diff != null) {
-     return "Node tree inequality:" +
-     "\n\nTree1:\n" + toStringTree() +
-     "\n\nTree2:\n" + node2.toStringTree() +
-     "\n\nSubtree1: " + diff.nodeA.toStringTree() +
-     "\n\nSubtree2: " + diff.nodeB.toStringTree();
+ if (node2.type < com.google.jscomp.Rhino.Node.JSDOC_INFO_PROP) {
+     return "Node tree inequality:" +
+     "\nTree1:\n" + toStringTree() +
+     "\nTree2:\n" + node2.toStringTree() +
+     "\nSubtree1: " + diff.nodeA.toStringTree() +
+     "\nSubtree2: " + diff.nodeB.toStringTree();
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 (() == 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.jsontoolkit.jsengine.RhinoNode.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:" +
    "\nTree1:\n" + toStringTree() +
    "\nTree2:\n" + node2.toStringTree() +
    "\nSubtree1: " + diff.nodeA.toStringTree() +
    "\nSubtree2: " + 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/rhino/Node.js
+++ /tmp/closure_133_Nopol/src/com/google/javascript/rhino/Node.js
@@ -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 {
          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!=null) {
+     return
+     (str.charAt(1) == 'E' || str.charAt(1) == 'e') &&

20
Listing 67: "The generated patch for the bug Lang 51"

Number of tests that execute the patch: 1
Execution time: 28 seconds

3.3 Lang 55

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

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

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
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 @@
    ratio = yDot0[j] / scale[j];
    yDotOnScale2 += ratio * ratio;
+      this.maxStep))) {
+      yDotOnScale2 += ratio * ratio;
+   }

Listing 76: "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 try again with a lower interpolation order
-   if ( signChangeIndex - start >= end - signChangeIndex ) {
+   if ((( signChangeIndex - start ) >= ( end - signChangeIndex )) || (xA <= org.
    apache.commons.math.analysis.solversBracketingNthOrderBrentSolver.REDUCTION_FACTOR)) {
      // 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 @@
   }
   if ( xbarw < length ) {
      return xbarw + ( correction/sumw);
+   if ((signChangeIndex - start) >= (end - signChangeIndex)) {
+      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 @@
   if ( getBasicRow(col) == null ) {
      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: 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 79: "The generated patch for the bug Math 42"

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

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 @@
if ((((atol) != (org.apache.commons.math.analysis.solvers.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.analysis.solvers.BaseSecantSolver.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:
+ throw new MathInternalError();
+}
+ if (((atol) != (org.apache.commons.math.analysis.solvers.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.analysis.solvers.BaseSecantSolver.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:
+ throw new MathInternalError();
+}

Listing 81: "The generated patch for the bug Math 49"
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
+ if (((!(1) != (lower)) && (org.apache.commons.math.analysis.solvers.UnivariateRealSolverImpl.this.result < org.apache.commons.math.analysis.solvers.UnivariateRealSolverImpl.this.defaultFunctionValueAccuracy)) || (initial <= lower)) {
  throw MathRuntimeException.createIllegalArgumentException("invalid interval, initial value parameters: lower={0}, initial={1}, upper={2}", lower, initial, upper);
+ "invalid interval, initial value parameters: lower={0}, initial={1}, upper={2}",
+ lower, initial, upper);
+ }
+
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

--- /tmp/math_78_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BrentSolver.java
+++ /tmp/math_78_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/BrentSolver.java
@@ -260,3 +260,3 @@
   // it should NOT be replaced by proximity test
- if (x0 == x2) {
+ if (((1 < x2) && (!(y0 <= i))) || (x0 == x2)) {
   // Linear interpolation.
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

--- /tmp/math_80_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
+++ /tmp/math_80_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
@@ -1138,3 +1138,5 @@
        final double tmp = work[i + k];
-      work[i + k] = work[j - k];
+      if (org.apache.commons.math.linear.EigenDecompositionImpl.this.cachedD != null) {
+        work[i + k] = work[j - k];
+      }
        work[j - k] = tmp;
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

--- /tmp/math_81_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
+++ /tmp/math_81_Nopol/src/main/java/org/apache/commons/math/linear/EigenDecompositionImpl.java
@@ -1585,4 +1585,4 @@
   case 1 : // one eigenvalue just deflated. use dMin1, dH1 for dMin and dN.
-    if (dMin1 == dH1 && dMin2 == dH2) {
+    if (org.apache.commons.math.linear.EigenDecompositionImpl.this.main != null) {
+      // cases 7 and 8.
-      }
+    }
+    } else { // case 9.
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

--- /tmp/math_85_Nopol/src/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverUtils.java
+++ /tmp/math_85_Nopol/src/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverUtils.java
@@ -197,9 +197,9 @@
} 26
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
if (tailZone != null) {
    if (tailZone.iStartRecurrence.getNameKey().equals(tailZone.iEndRecurrence.getNameKey())) {
        id. length () ==0) {
            if (ZoneInfoCompiler.verbose()) {
                System.out.println("Fixing duplicate recurrent name key - " + tailZone.iStartRecurrence.getNameKey());
                tailZone.iStartRecurrence.getNameKey();
            }
        }
    }
    else {
        tailZone = new DSTZone(tailZone.getID(), tailZone.iStandardOffset, tailZone.iStartRecurrence.renameAppend(" - Summer"), tailZone.iEndRecurrence);
    }
}

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

--- /tmp/time_18_Nopol/src/main/java/org/joda/time/chrono/BasicChronology.java
+++ /tmp/time_18_Nopol/src/main/java/org/joda/time/chrono/BasicChronology.java
@@ -604,3 +604,5 @@
    FieldUtils.verifyValueBounds(DateTimeFieldType.monthOfYear(), monthOfYear, 1,
    getMaxMonth(year));
-   FieldUtils.verifyValueBounds(DateTimeFieldType.dayOfMonth(), dayOfMonth, 1,
+   if ((!(10 == monthOfYear)) && (((31) - (2)) != (dayOfMonth))) {
+      FieldUtils.verifyValueBounds(DateTimeFieldType.dayOfMonth(), dayOfMonth, 1,
     getDaysInYearMonth(year, monthOfYear));
     return getYearMonthDayMillis(year, monthOfYear, dayOfMonth);

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

--- /tmp/time_19_Nopol/src/main/java/org/joda/time/DateTimeZone.java
+++ /tmp/time_19_Nopol/src/main/java/org/joda/time/DateTimeZone.java
@@ -899,3 +899,3 @@
   } else if (offsetLocal > 0) {
   } else if (org.joda.time.DateTimeZone.this.iID != null) {
         long prev = previousTransition(instantAdjusted);

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

