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 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: 473964c2d5c668517bd45be1d4878074858cb934f
- 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

```java
--- /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) {
```
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>

```
if (((removed) && (removed)) || (org.jfree.data.time.TimeSeries.DEFAULT_RANGE_DESCRIPTION.length() <= org.jfree.data.time.TimeSeries.this.maxY)) {
    findBoundsByIteration();
}
```

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

```
--- /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

```
--- /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) {
+        this.data.add(-index - 1, new XYDataItem(x, y));
     }
```

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

```
--- /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
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
+ ) } } 
- else if (orientation == PlotOrientation.VERTICAL) {
- drawVerticalItem(g2, state, dataArea, plot, domainAxis, rangeAxis,
- statData, row, column);
- }

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

--- /tmp/chart_26_Nopol/source/org/jfree/chart/plot/CategoryPlot.java
+++ /tmp/chart_26_Nopol/source/org/jfree/chart/plot/CategoryPlot.java
@@ -2537,3 +2537,3 @@
  boolean b2 = (area.getHeight() \leq MINIMUM_HEIGHT_TO_DRAW);
- if (b1 || b2) {
+ if (org.jfree.chart.plot.CategoryPlot.DEFAULT_CROSSHAIR_STROKE!=null) {
    return;

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

--- /tmp/closure_1_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_1_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1410,7 +1410,9 @@
  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.this.type)) {
+    return "Node tree inequality:" +
+    "\nTree1:\n" + toStringTree() +
+    "\nTree2:\n" + node2.toStringTree() +
+    "\nSubtree1:  " + diff.nodeA.toStringTree() +
+    "\nSubtree2:  " + diff.nodeB.toStringTree();
  }
}

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

--- /tmp/closure_2_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_2_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
@@ -1663,4 +1663,6 @@
  currentProperties.clear();
  checkInterfaceConflictProperties(t, n, functionPrivateName,
  properties, currentProperties, interfaceType);
+  if (com.google.javascript.jscomp.TypeCheck.this.unknownCount < com.google.javascript.
+    jscomp.TypeCheck.this.typedCount) {
+    checkInterfaceConflictProperties(t, n, functionPrivateName,
+    properties, currentProperties, interfaceType);
  }
  properties.putAll(currentProperties);

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

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 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

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

Number of tests that execute the patch: 3
Execution time: 1 minute, 59 seconds

2.16 Closure 22

Listing 25: "The generated patch for the bug Closure 22"

Number of tests that execute the patch: 3

8
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
```java
+ if (fieldName.length() != 5) {
+   // Duplicate field name, warning and skip
+   reporter.warning(
+     "Duplicate record field " + fieldName,
+     sourceName,
+     n.getLineNo(), fieldNameNode.getLineNo());
+   }
```

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

```java
--- /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() +
-      "\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() +
+        "\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

```java
--- /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 == '-')) {
      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

```java
--- /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() +
-      "\nSubtree1: " + diff.nodeA.toStringTree() +
-      "\nSubtree2: " + diff.nodeB.toStringTree();
+    if (com.google.javascript.rhino.Node.this.type < 32) {
+      return "Node tree inequality:" +
+        "\nTree1:\n" + 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: 68
Execution time: 1 minute, 47 seconds

2.28 Closure 49

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

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

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

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

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

Number of tests that execute the patch: 0
Execution time: 0 minutes, 0 seconds
if (error != null) {
    for (int i = 0; i < charno; i++) {
        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

--- /tmp/closure_63_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
+++ /tmp/closure_63_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
@@ -96,4 +96,3 @@
    // at the end of the line
    - if (excerpt.equals(LINE)) {
    -     & & 0 <= charno & & charno < sourceExcerpt.length()) {
    + if (error != null) {
        for (int i = 0; i < charno; i++) {
        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

--- /tmp/closure_66_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_66_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
@@ -821,3 +821,5 @@
    if (type == null) {
        nullCount ++;
    + if (com.google.javascript.jscomp.TypeCheck.this.inExterns) {
    +     nullCount ++;
    + }
    } else if (type.isUnknownType()) {
        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

--- /tmp/closure_67_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_67_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1384,7 +1384,9 @@
    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) != (node2.type)) {
    +     return "Node tree inequality:" +
    +         "\nTree1:\n" + toStringTree() +
    +         "\nTree2:\n" + node2.toStringTree() +
    +         "\nSubtree1: " + diff.nodeA.toStringTree() +
    +         "\nSubtree2: " + diff.nodeB.toStringTree();
    + }
    }

    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

--- /tmp/closure_72_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_72_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1381,7 +1381,9 @@
    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) != (node2.type)) {
    +     return "Node tree inequality:" +
    +         "\nTree1:\n" + toStringTree() +
    +         "\nTree2:\n" + node2.toStringTree() +

2.38 Closure 75

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

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

2.39 Closure 76

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

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

2.40 Closure 78

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

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

2.41 Closure 111

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

Listing 49: "The generated patch for the bug Closure 78"
+ 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:\n" + toStringTree() +
-            "\nTree2:\n" + 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:\n" + toStringTree() +
+                "\nTree2:\n" + 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:\n" + toStringTree() +
-            "\nTree2:\n" + 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:\n" + toStringTree() +
+                "\nTree2:\n" + 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:\n" + toStringTree() +
-            "\nTree2:\n" + 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:\n" + toStringTree() +
+                "\nTree2:\n" + node2.toStringTree() +
+                "\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\nSubtree2: " + diff.nodeB.toStringTree();
+        }
    }

Listing 54: "The generated patch for the bug Closure 116"
```
- 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.javascript.rhino.Node.JSDOC_INFO_PROP) {
  return "Node tree inequality:" +
  "\n\nTree1:\n" + toStringTree() +
  "\n\nTree2:\n" + node2.toStringTree() +
  "\n\nSubtree1: " + diff.nodeA.toStringTree() +
  "\n\nSubtree2: " + diff.nodeB.toStringTree();
}
```

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 @@

  if (((com.google.javascript.jscomp.GlobalNamespace.this.externsRoot != null) && ((-1) !=
  ((2) - (com.google.javascript.jscomp.GlobalNamespace.this.globalNames.size()))) || ((com.
  google.javascript.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() +
```

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() +
```

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() +
-      "\nTreeNode2:\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() +
+          "\nTreeNode2:\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() +
-      "\nTreeNode2:\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() +
+          "\nTreeNode2:\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/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 != null) {
+        return
+            (str.charAt(1) == 'E' || str.charAt(1) == 'e') &&

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

3.3 Lang 53

Listing 68: "The generated patch for the bug Lang 53"

3.4 Lang 58

Listing 69: "The generated patch for the bug Lang 58"

4 Math

Nopol repairs 24 bugs in the project Math.

4.1 Math 2

Listing 70: "The generated patch for the bug Math 2"
### 4.3 Math 7

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

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

### 4.4 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
if (org.apache.commons.math3.optimization.linear.SimplexTableau.this.numSlackVariables < org.apache.commons.math3.optimization.linear.SimplexTableau.this.constraints.size()) {
    columnsToRemove.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 @@
    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 @@
            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 @@
    } else if (getBasicRow(col) == null) {
        columnsToRemove.add(col);
+            if (1 <= org.apache.commons.math.optimization.linear.SimplexTableau.this
+                numSlackVariables) {
+                columnsToRemove.add(col);

23
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;
+ } else 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 @@
+ 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 @@
+ 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();
+ 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:
```java
+     throw new MathInternalError();
+ }

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

--- /tmp/math_57_Nopol/src/main/java/org/apache/commons/math/stat/clustering/EuclideanIntegerPoint.java
+++ /tmp/math_57_Nopol/src/main/java/org/apache/commons/math/stat/clustering/EuclideanIntegerPoint.java
@@ -84,4 +84,6 @@
     for (int i = 0; i < point.length; i++) {
         if (point[i] != otherPoint[i]) {
             return false;
+            if (((otherPoint[i])) != (otherPoint.length)) {
+                if (point[i] != otherPoint[i]) {
+                    return false;
+                }
         }
     }

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

--- /tmp/math_58_Nopol/src/main/java/org/apache/commons/math/analysis/function/Gaussian.java
+++ /tmp/math_58_Nopol/src/main/java/org/apache/commons/math/analysis/function/Gaussian.java
@@ -181,4 +181,6 @@
     } if (param[2] <= 0) {
         throw new NotStrictlyPositiveException(param[2]);
+        if ((param[2]) == 0) {
+            if (param[2] <= 0) {
+                throw new NotStrictlyPositiveException(param[2]);
+            }
     }

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

--- /tmp/math_69_Nopol/src/main/java/org/apache/commons/math/stat/correlation/PearsonsCorrelation.java
+++ /tmp/math_69_Nopol/src/main/java/org/apache/commons/math/stat/correlation/PearsonsCorrelation.java
@@ -192,3 +192,5 @@
     outMatrix.setEntry(i, j, corr);
     outMatrix.setEntry(j, i, corr);
+    if (2 < nVars) {
+        outMatrix.setEntry(j, 1, corr);
+    }

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

--- /tmp/math_73_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverImpl.java
+++ /tmp/math_73_Nopol/src/main/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverImpl.java
@@ -224,6 +224,6 @@
     protected void verifySequence(final double lower, final double initial, final double upper) {
         if (!isSequence(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

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);
    + "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 ((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 (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 @@
    + 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

```
--- /tmp/mockito_29_Nopol/src/org/mockito/internal/matchers/Same.java
+++ /tmp/mockito_29_Nopol/src/org/mockito/internal/matchers/Same.java
@@ -28,3 +28,5 @@
     appendQuoting(description);
     description.appendText(wanted.toString());
+    if (org.mockito.internal.matchers.Same.this.wanted != null) {
+        description.appendText(wanted.toString());
+    }
     appendQuoting(description);
```

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

```
--- /tmp/mockito_38_Nopol/src/org/mockito/internal/matchers/Equals.java
+++ /tmp/mockito_38_Nopol/src/org/mockito/internal/matchers/Equals.java
@@ -19,3 +19,3 @@
     public boolean matches(Object actual) {
-        if (this.wanted == null) {
+        if (((actual != null) && (actual != null))) {
+            return actual == null;
        }
```

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

```
--- /tmp/time_4_Nopol/src/main/java/org/joda/time/Partial.java
+++ /tmp/time_4_Nopol/src/main/java/org/joda/time/Partial.java
@@ -458,3 +458,5 @@
     newTypes[i] = fieldType;
-    newValues[i] = value;
+    if (((20) - (value + newTypes.length) < value) || ((2) != (org.joda.time.Partial.
       this.iTypes.length))) {
+        newValues[i] = value;
+    }
    System.arraycopy(iTypes, i, newTypes, i + 1, newTypes.length - i - 1);
```

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

```
--- /tmp/time_7_Nopol/src/main/java/org/joda/time/format/DateTimeParserBucket.java
+++ /tmp/time_7_Nopol/src/main/java/org/joda/time/format/DateTimeParserBucket.java
@@ -358,3 +358,5 @@
     saveField(DateTimeFieldType.year(), iDefaultYear);
-    return computeMillis(resetFields, text);
+    if (resetFields) {
+        return computeMillis(resetFields, text);
+    }
```

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

6.4 Time 12

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

6.5 Time 14

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

6.6 Time 16

saveField(DateTimeFieldType.year(), iDefaultYear);
if (resetFields) {
  return computeMillis(resetFields, text);
} else {
  return computeMillis(resetFields, text);
}
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 (org.joda.time.DateTimeZone.this.iID != null) {
     long prev = previousTransition(instantAdjusted);
   } else if (offsetLocal > 0) {

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

