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

To refer to this document:

\begin{verbatim}
@techreport{techrepNopolDefects4j2017,
  TITLE = {{The Patches of the Nopol Automatic Repair System on the Bugs of Defects4J version 1.1.0}},
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}
\end{verbatim}

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 \cite{1}.

Reproduction information:

- Nopol source code: https://github.com/SpoonLabs/nopol/ \\
  Commit used: 473964c2d5c66517bd45be1d87074858eb934f

- 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
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 @@
-     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

```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
h[3] = h[2];
if (this.rightBlock != null) {
    RectangleConstraint c4 = new RectangleConstraint(0.0, new Range(0.0, constraint.getWidth() - w[2]), LengthConstraintType.RANGE, h[2], null, LengthConstraintType.FIXED);
    Size2D size = this.rightBlock.arrange(g2, c4);
    w[3] = size.width;
    if (null!=null) {
        if (this.rightBlock != null) {
            RectangleConstraint c4 = new RectangleConstraint(0.0, new Range(0.0, constraint.getWidth() - w[2]), LengthConstraintType.RANGE, h[2], null, LengthConstraintType.FIXED);
            Size2D size = this.rightBlock.arrange(g2, c4);
            w[3] = size.width;
        }
    }
}

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

if (end < start) {
    throw new IllegalArgumentException("Requires start <= end.");
} else if (org.jfree.data.time.TimeSeries.this.data.size() == org.jfree.data.Range.this.range.length()) {
    throw new IllegalArgumentException("Requires start <= end.");
}

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

if (this.lower == range.lower) {
    return false;
} else if ((1 + org.jfree.data.Range.this.lower) - (-1) < org.jfree.data.Range.this.upper) || (org.jfree.data.Range.this.lower <= 0) {
    return false;
}

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

PlotOrientation orientation = plot.getOrientation();
if (orientation == PlotOrientation.HORIZONTAL) {
    drawHorizontalItem(g2, state, dataArea, plot, domainAxis, rangeAxis, statData, row, column);
} else if (orientation == PlotOrientation.VERTICAL) {
    drawVerticalItem(g2, state, dataArea, plot, domainAxis, rangeAxis, statData, row, column);
}

3
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() <= 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 ((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 @@
+    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

--- /tmp/closure_3_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_3_Nopol/src/com/google/javascript/jscomp/TypeCheck.java
@@ -1663,4 +1663,6 @@
+    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 12: "The generated patch for the bug Closure 3"

Number of tests that execute the patch: 17
Execution time: 2 minutes, 7 seconds
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
 Executes time: 3 minutes, 2 seconds

### 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:"
+ 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 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);
+ if (com.google.javascript.rhino.Node.this.sourcePosition <= 1) {
+ return new NodeMismatch(this, node2);
+ } }
```

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();
+ if (functionAnalysisResults.size() == -1 +
+ com.google.javascript.jscomp.TypedScopeCreator.DELEGATE_PROXY_SUFFIX.
+ length() == -1 + com.google.javascript.jscomp.TypedScopeCreator.this.
+ functionAnalysisResults.size()) {
+ return rValue.getJSType();
+ }
+ return rValue.getJSType();
```

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:"
+ if (com.google.javascript.rhino.Node.IS_DISPATCHER) {
+ return "Node tree inequality:"
+ "\nTree1:\n" + toStringTree() +
+ "\nSubtree1: " + diff.nodeA.toStringTree() +
+ "\nSubtree2: " + diff.nodeB.toStringTree();
+ } } }
```

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

Number of tests that execute the patch: 2 minutes, 1 second
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) {
+ 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;
+ }
}

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 break;
+ }

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

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

--- /tmp/closure_26_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_26_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) != (node2.type)) {
+         return "Node tree inequality:" +
+         "\nTree1:\n" + node2.toStringTree() +
+         "\nSubtree1: " + diff.nodeA.toStringTree() +
+         "\nSubtree2: " + diff.nodeB.toStringTree();
     }
 }

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

--- /tmp/closure_28_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_28_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 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

--- /tmp/closure_29_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_29_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) != (node2.type)) {
+         return "Node tree inequality:" +
+         "\nTree1:\n" + toStringTree() +
+         "\nTree2:\n" + node2.toStringTree() +
+         "\nSubtree1: " + diff.nodeA.toStringTree() +
+         "\nSubtree2: " + diff.nodeB.toStringTree();
     }
 }

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

Listing 30: "The generated patch for the bug Closure 31"
Number of tests that execute the patch: 3
Execution time: 1 minute, 54 seconds

Listing 31: "The generated patch for the bug Closure 33"
Number of tests that execute the patch: 8
Execution time: 1 minute, 52 seconds

Listing 32: "The generated patch for the bug Closure 35"
Number of tests that execute the patch: 8
Execution time: 1 minute, 52 seconds
+ 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 @@

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 @@
+ 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 (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

```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() +
-        "\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 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() +
-        "\nTree2:\n" + node2.toStringTree() +
-        "\nSubtree1: " + diff.nodeA.toStringTree() +
-        "\nSubtree2: " + diff.nodeB.toStringTree();
+            LABEL_PROP) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\nTree2:\n" + node2.toStringTree() +
+                "\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\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() +
-        "\nTree2:\n" + node2.toStringTree() +
-        "\nSubtree1: " + diff.nodeA.toStringTree() +
-        "\nSubtree2: " + diff.nodeB.toStringTree();
+            LABEL_PROP) {
+            return "Node tree inequality:" +
+                "\nTree1:\n" + toStringTree() +
+                "\nTree2:\n" + node2.toStringTree() +
+                "\nSubtree1: " + diff.nodeA.toStringTree() +
+                "\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
// 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

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
if (error != null) {
    for (int i = 0; i < charno; i++) {
        // at the end of the line
        if (excerpt.equals(LINE) 
            && 0 <= charno && charno < sourceExcerpt.length()) {
            for (int i = 0; i < charno; i++) {
                // return "Node tree inequality:"
                +
                "\nTree1:
" + toStringTree() +
                "\nTree2:
" + node2.toStringTree() +
                "\nSubtree1: " + diff.nodeA.toStringTree() +
                "\nSubtree2: " + diff.nodeB.toStringTree();
            }
        } else if (type.isUnknownType()) {
            return "Node tree inequality:"
            +
            "\nTree1:
" + toStringTree() +
            "\nTree2:
" + node2.toStringTree() +
            "\nSubtree1: " + diff.nodeA.toStringTree() +
            "\nSubtree2: " + diff.nodeB.toStringTree();
        } 
    } 
}

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/google/javascript/jscomp/LightweightMessageFormatter.java
+++ /tmp/closure_63_Nopol/src/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/google/javascript/jscomp/TypeCheck.java
+++ /tmp/closure_66_Nopol/src/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/google/javascript/rhino/Node.java
+++ /tmp/closure_67_Nopol/src/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() +
+            "\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/google/javascript/rhino/Node.java
+++ /tmp/closure_72_Nopol/src/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() +
+            "\nSubtree1: " + diff.nodeA.toStringTree() +
+            "\nSubtree2: " + diff.nodeB.toStringTree();
+        }
    }
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:" +
        "\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.FUNCTION_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 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 @@
    if (a == null) {
        if (b == null) {

Listing 50: "The generated patch for the bug Closure 111"
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"
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.javascript.jscomp.GlobalNamespace.this.externsRoot != null) && ((-1) !=
((2) - (com.google.javascript.jscomp.GlobalNamespace.this.globalNames.size()))) || (!(com.
+    handleGet(module, scope, n, parent, name, type);
+    }
```

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 @@
-    handleGet (module, scope, n, parent, name, type);
+    if (diff != null) {
+        return "Node tree inequality:
+    " + toStringTree() +
+    "\n\nTree1: " + 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:
+    " + toStringTree() +
+    "\n\nTree1: " + node2.toStringTree() +
+    "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+    "\n\nSubtree2: " + diff.nodeB.toStringTree();
+    }
```

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 @@
-    handleGet (module, scope, n, parent, name, type);
+    if (diff != null) {
+        return "Node tree inequality:
+    " + toStringTree() +
+    "\n\nTree1: " + 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:
+    " + toStringTree() +
+    "\n\nTree1: " + node2.toStringTree() +
+    "\n\nSubtree1: " + diff.nodeA.toStringTree() +
+    "\n\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 (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:" +
    "\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.INFERRED_FUNCTION) {
    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.EOF || token == JsDocToken.EOL ||
- token == JsDocToken.EOC) {
+ 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/NumberUtils.java
+++ /tmp/lang_44_Nopol/src/java/org/apache/commons/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/BooleanUtils.java
+++ /tmp/lang_51_Nopol/src/java/org/apache/commons/BooleanUtils.java
@@ -676 ,6 +676 ,6 @@
     return;
     if (str.equalsIgnoreCase("true", true)) {
         return;
-        if (str.equalsIgnoreCase("false", true)) {
-            return;
-        }
+        return;
+    }

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

Number of tests that execute the patch: 28
Execution time: 5 seconds
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 53

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
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

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

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

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
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);
     }
     else 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
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(j, i, corr);
-     outMatrix.setEntry(i, j, corr);
+     if (2 < nVars) {
+         outMatrix.setEntry(j, i, 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 @@
     }
-     if (!isSequence(lower, initial, upper)) {
-         throw new MathInternalError();
+     if (!isSequence(lower, initial, upper)) {
+         throw new MathInternalError();
     }

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

Number of tests that execute the patch: 1
+ 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);
    return org.apache.commons.math.analysis.solvers.
UnivariateRealSolverImpl.this.result;
} else {
    return initial;
}

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];
    if (org.apache.commons.math.linear.EigenDecompositionImpl.this.cachedD != null) {
        work[i + k] = work[j - k];
    } else {
        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 , dN1 for dMin and dN.
        if (dMin1 == dN1 && dMin2 == dN2) {
            // 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/UnivariateRealSolverUtil.java
+++ /tmp/math_85_Nopol/src/java/org/apache/commons/math/analysis/solvers/UnivariateRealSolverUtil.java
@@ -197 ,9 +197 ,9 @@
    // it should NOT be replaced by proximity test
    if (x0 == x2) {
        if (((1 < x2) && (!(y0 <= i))) || (x0 == x2)) {
            // Linear interpolation.
            Listing 88: "The generated patch for the bug Math 85"

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

26
- 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, 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 (! 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
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

Number of tests that execute the patch: 18  
Execution time: 37 seconds
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,
- getDaysInYearMonth(year, monthOfYear));
+ 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

