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: 47396bc2d5c66517bd45be1d87074858cb934f
- Defects4j version: https://github.com/rjust/defects4j/releases/tag/v1.1.0/
- Execution traces: https://github.com/Spirals-Team/defects4j-repair/tree/master/results/2017-march/

1 Chart

Nopol repairs 9 bugs in the project Chart.

1.1 Chart 3

--- /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
+++ /tmp/chart_3_Nopol/source/org/jfree/data/time/TimeSeries.java
@@ -884,3 +884,3 @@

- if (removed) {
+ if (removed) {


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

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

Listing 1: "The generated patch for the bug Chart 3"
Number of tests that execute the patch: 86
Execution time: 50 seconds

1.2 Chart 4

Listing 2: "The generated patch for the bug Chart 4"
Number of tests that execute the patch: 18
Execution time: 7 minutes, 32 seconds

1.3 Chart 5

Listing 3: "The generated patch for the bug Chart 5"
Number of tests that execute the patch: 6
Execution time: 38 seconds

1.4 Chart 9

Listing 4: "The generated patch for the bug Chart 9"
Number of tests that execute the patch: 4
Execution time: 34 seconds

1.5 Chart 13
### Chart 13

```java
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;
}
```

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

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

### Chart 17

```java
if (end < start) {
    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

### Chart 21

```java
if (!(this.lower == range.lower)) {
    return false;
    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

### Chart 25

```java
PlotOrientation orientation = plot.getOrientation();
if (orientation == PlotOrientation.HORIZONTAL) {
    drawHorizontalItem(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: 12  
Execution time: 37 seconds
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 (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
Execution time: 3 minutes, 2 seconds

2.10 Closure 15

--- /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:"
             + "\n\nTree1:\n" + toStringTree() +
- "\n\nTree2:\n" + node2.toStringTree() +
- "\n\nSubtree1:" + diff.nodeA.toStringTree() +
- "\n\nSubtree2:" + diff.nodeB.toStringTree();
+ if (com.google/javascript/rhino.Node.this.type < 32) {
+     return "Node tree inequality:"
+             + "\n\nTree1:\n" + toStringTree() +
+             + "\n\nTree2:\n" + node2.toStringTree() +
+             + "\n\nSubtree1:" + diff.nodeA.toStringTree() +
+             + "\n\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

--- /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

--- /tmp/closure_17_Nopol/src/google/javascript/jscomp/TypedScopeCreator.java
+++ /tmp/closure_17_Nopol/src/google/javascript/jscomp/TypedScopeCreator.java
@@ -1294,3 +1294,5 @@
// then we can safely use that.
    return rValue.getJSType();
+    if (!(com.google/javascript/jscomp.TypedScopeCreator.DELEGATE_PROXY_SUFFIX.
        length() == -1 + com.google/javascript/jscomp.TypedScopeCreator.this.
        functionAnalysisResults.size()))) {
+        return rValue.getJSType();
        }
    } else if (rValue.isOr()) {

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

Number of tests that execute the patch: 25
Execution time: 2 minutes, 1 second

2.13 Closure 18

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

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

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

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: 2
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
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
```java
if (diff != null) {
  return "Node tree inequality:" +
  "\nTree1:\n" + toStringTree() +
  "\nTree2:\n" + node2.toStringTree() +
  "\nSubtree1: " + diff.nodeA.toStringTree() +
  "\nSubtree2: " + diff.nodeB.toStringTree();
}
```

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

```java
if (diff != null) {
  return "Node tree inequality:" +
  "\nTree1:\n" + toStringTree() +
  "\nTree2:\n" + node2.toStringTree() +
  "\nSubtree1: " + diff.nodeA.toStringTree() +
  "\nSubtree2: " + diff.nodeB.toStringTree();
  if (com.google.javascript.rhino.Node.this.type <= com.google.javascript.rhino.Node.IS_DISPATCHER) {
    + return "Node tree inequality:" +
    + "\nTree1:\n" + toStringTree() +
    + "\nTree2:\n" + node2.toStringTree() +
    + "\nSubtree1: " + diff.nodeA.toStringTree() +
    + "\nSubtree2: " + diff.nodeB.toStringTree();
  }
}
```

Listing 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

```java
if (! hasProperty(prop)) {
  + typeToInfer = getNativeType(JSTypeNative.VOID_TYPE)
  + .getLeastSupertype(propType);
  + if (com.google.javascript.rhino.jstype.PrototypeObjectType.this.prettyPrint) {
    + typeToInfer = getNativeType(JSTypeNative.VOID_TYPE)
    + .getLeastSupertype(propType);
  }
}
```

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
// Add the property to the record.
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: 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.getCharndo());
+   }
+ }

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

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

2.24 Closure 36

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

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

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

2.25 Closure 38

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

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

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

2.26 Closure 40

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

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

2.27 Closure 45

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

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

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

2.28 Closure 49

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

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

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

2.29 Closure 50

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

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

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

2.30 Closure 55
--- /tmp/closure_55_Nopol/src/com/google/javascript/jscomp/FunctionRewriter.java
+++ /tmp/closure_55_Nopol/src/com/google/javascript/jscomp/FunctionRewriter.java
@@ -92 ,10 +92 ,12 @@
     // 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();
                }
            } else {
                Node addingRoot = compiler.getNodeForCodeInsertion(null);
                addingRoot.addChildrenToFront(helperCode);
                compiler.reportCodeChange();
            }
        }
    }

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

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

2.31 Closure 60

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

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

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

2.32 Closure 61

--- /tmp/closure_61_Nopol/src/com/google/javascript/rhino/Node.java
+++ /tmp/closure_61_Nopol/src/com/google/javascript/rhino/Node.java
@@ -1460 ,7 +1460 ,9 @@
 if (diff != null) {
     return "Node tree inequality:" +
     "\n\nTree1:" + toStringTree() +
-    "\nNewSubtree1:" + diff.nodeA.toStringTree();
+    "\nNewSubtree1:" + diff.nodeA.toStringTree() +
+    "\nNewSubtree2:" + diff.nodeB.toStringTree();
+    if ((com.google.java.jscomp.rhino.Node.this.type) != (node2.type)) {
+        return "Node tree inequality:" +
+        "\nTree1:" + toStringTree() +
+        "\nNewSubtree1:" + diff.nodeA.toStringTree() +
+        "\nNewSubtree2:" + diff.nodeB.toStringTree();
    }
}

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

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

2.33 Closure 62

--- /tmp/closure_62_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
+++ /tmp/closure_62_Nopol/src/com/google/javascript/jscomp/LightweightMessageFormatter.java
@@ -96 ,10 +96 ,3 @@
     // at the end of the line
     if (excerpt.equals(LINE)) {
         && 0 <= charno && charno < sourceExcerpt.length()) {
+    }

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

Number of tests that execute the patch: 1
Execution time: 30 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))
     if (error != null) {
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 ++;
     } 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()
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() +
Listing 46: "The generated patch for the bug Closure 72"
Number of tests that execute the patch: 2
Execution time: 1 minute, 32 seconds

2.38 Closure 75

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

2.39 Closure 76

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

2.40 Closure 78

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

2.41 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"
Listing 54: "The generated patch for the bug Closure 116"
Number of tests that execute the patch: 13
Execution time: 2 minutes, 13 seconds

Listing 55: "The generated patch for the bug Closure 119"
Number of tests that execute the patch: 394
Execution time: 32 minutes, 2 seconds

Listing 56: "The generated patch for the bug Closure 120"
Number of tests that execute the patch: 8
Execution time: 2 minutes, 11 seconds

Listing 57: "The generated patch for the bug Closure 121"
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() +
+        "\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() +
+        "\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.EOC || token == JsDocToken.EOL ||
    token == JsDocToken.EOF) {
+    if (com.google.javascript.jscomp.parsing.JsDocInfoParser.this.unreadToken!=null) {
      return new ExtractionInfo("", token);
    }

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

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

3 Lang

Nopol repairs 4 bugs in the project Lang.

3.1 Lang 44

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

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

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

3.2 Lang 51

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

20
Number of tests that execute the patch: 1
Execution time: 28 seconds

3.3 Lang 53

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

3.4 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

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

4.2 Math 4
4.3 Math 7

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

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

4.4 Math 24

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

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

4.5 Math 28

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

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

4.6 Math 33

Number of tests that execute the patch: 3
Execution time: 3 minutes, 1 seconds
if (org.apache.commons.math3.optimization.linear.SimplexTableau.this.numSlackVariables < org.apache.commons.math3.optimization.linear.SimplexTableau.this.constraints.size()) {
    columnsToDrop.add(i);
}

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

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

4.7 Math 39

+++ /tmp/math_39_Nopol/src/main/java/org/apache/commons/math/ode/nonstiff/AdaptiveStepsizeIntegrator.java
@@ -263,3 +263,5 @@
    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 @@
   if (getBasicRow(col) == null) {
-      columnsToDrop.add(col);
+      if (1 <= org.apache.commons.math.optimization.linear.SimplexTableau.this.numSlackVariables) {
               columnsToDrop.add(col);

Listing 79: "The generated patch for the bug Math 42"
Number of tests that execute the patch: 16
Execution time: 4 minutes, 39 seconds

4.11 Math 44

```java
--- /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;
    + }
    + }
```

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

4.12 Math 49

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

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

4.13 Math 50

```java
--- /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 @@
    }
    else if (Math.abs(f0) <= atol)) {
        switch (allowed) {
    + if (((atol) != (org.apache.commons.math.linear.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.linear.BaseSecantSolver.this.method != null)) || (f0 < atol)) {
    + switch (allowed) {
    + case ANY_SIDE:
    + return x1;
    + case LEFT_SIDE:
    + return inverted ? x1 : x0;
    + case RIGHT_SIDE:
    + return inverted ? x0 : x1;
    + case BELOW_SIDE:
    + return (f1 <= 0) ? x1 : x0;
    + case ABOVE_SIDE:
    + return (f1 >= 0) ? x1 : x0;
    + default:
        throw new MathInternalError();
    + if (((atol) != (org.apache.commons.math.linear.BaseSecantSolver.DEFAULT_ABSOLUTE_ACCURACY)) && (org.apache.commons.math.linear.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:
```

Listing 79: "The generated patch for the bug Math 42"

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

Listing 81: "The generated patch for the bug Math 49"
Listing 82: "The generated patch for the bug Math 50"

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

4.14 Math 57

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

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

4.15 Math 58

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

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

4.16 Math 69

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

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

4.17 Math 73
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 , 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;
+  }
 }
}

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;
        } else {
            return computeMillis(resetFields, text);
```

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
if ( tailZone != null ) {
  if (tailZone.iStartRecurrence.getNameKey().equals(tailZone.iEndRecurrence.getNameKey())) {
    if (id.length() == 0) {
      System.out.println("Fixing duplicate recurrent name key - " +
          tailZone.iStartRecurrence.getNameKey());
    }
  } else {
    tailZone = new DSTZone (tailZone.getID(),
        tailZone.iStandardOffset,
        tailZone.iStartRecurrence.renameAppend(" - Summer"),
        tailZone.iEndRecurrence);
  }
}

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

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

6.4 Time 12

if ( DateTimeUtils.isContiguous (partial)) {
  if (((fieldIndex) != (1)) && (valueToAdd <= values.length)) || (valueToAdd < -1)) {
    long instant = 0L;
}

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

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

6.6 Time 16

saveField(DateTimeFieldType.year(), iDefaultYear);
if (resetFields) {
  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

```java
--- /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

```java
--- /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

