Reachability in 1-VASS with tests
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1-VASS with \( = \) & \( \neq \) tests

Example:

Reachability = existence of a run from \((s, 0)\) to \((t, 0)\)

State of the art on 1-VASS with tests:

<table>
<thead>
<tr>
<th></th>
<th>Without tests</th>
<th>With ( = ) tests</th>
<th>With ( = ) &amp; ( \neq )</th>
<th>with ( \leq ) &amp; ( \geq )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NP-complete</td>
<td>NP-complete</td>
<td>Open (PSPACE &amp; NP-hard)</td>
<td>PSPACE-complete</td>
</tr>
</tbody>
</table>

My contribution:
NP-completeness when all \( \neq \) are on the same state

To give a NP-certificate, we have to find a new run that is easy to remember and to verify. The hard part is for the certificate to prove that the run does not hit the \( \neq \) guards.

Core idea: « Compression » arguments: