Masters Algorithm

chris.rossouw5

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1 Positive Algorithm

Algorithm 1: Automaton Coverage

input : An LR Graph $LR_G = (V, E, v_0, v_{acc})$
output : A test suite covering all edges in LR_G

$reduction\_path(u \dashrightarrow_{A/|\gamma|} v) = \iota(p \in E_{\rightarrow}^{|\gamma|}, vert(p) = v \dots u) \circ (u \dashrightarrow_{A/|\gamma|} v) \circ \iota(v \rightarrow_A v')$

$embed(red\_path) = \{complete\_path \mid complete\_path = v_0 \dots \circ p \circ \dots v_{acc}, complete\_path \text{ is shallowest imbedding of } red\_path\}$

$test\_suite \leftarrow \varnothing$

for $e \in E_{\dashrightarrow}$ **do**

  $complete = embed(reduction\_path(e))$

  $test\_suite. \cup \{wp(complete)\}$

end

return *test_suite*

2 Negative Stack Mutations

We define equivalent stack sequences as $wp(p) = wp(q) \implies vert(p)$ *is equivalent to* $vert(q)$ for paths p and q.

2.1 Deletion

Let s be a reduction path such that $pre \cup s \cup post$ is a valid path over an automaton graph LR_G.

We may delete s if $vert(post)$ is not equivalent to the stack sequences originating from the last vertex in pre

2.2 Insertion

We may insert a stack sequence $vert(s)$ of a reduction path s after any node v such that $u \rightarrow_A v$ is the last edge visited before v and $vert(s)$ is not equivalent to a stack sequence corresponding to any reduction path originating from v.

2.3 Substitution

We may substitute a reduction path $p \mid vert(p) = u...v$ by a reduction path s if $vert(s)$ is not equivalent to any stack sequences corresponding to reduction paths originating from u