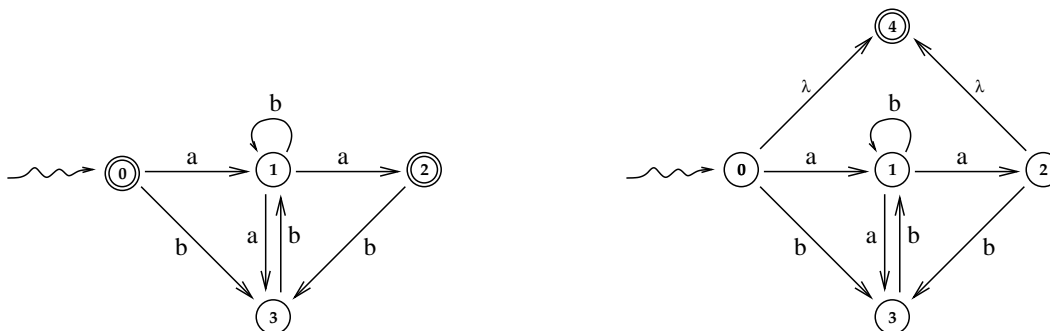


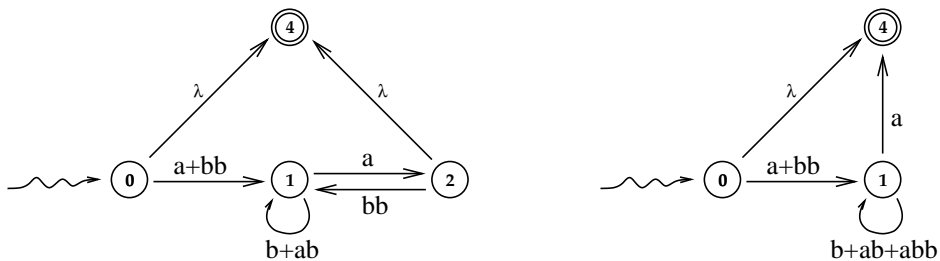
Constructing a Regular Expression from an NFA

To avoid clutter, we do not show any arc whose label is \emptyset .

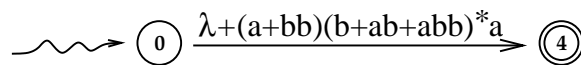
1. In the first example, we replace the multiple final states with a single (new) final state. The label of each arc from an original final state to the new final state is λ . Note that the start state is no longer final.



We now eliminate States 3 and 2 using Rule 5.

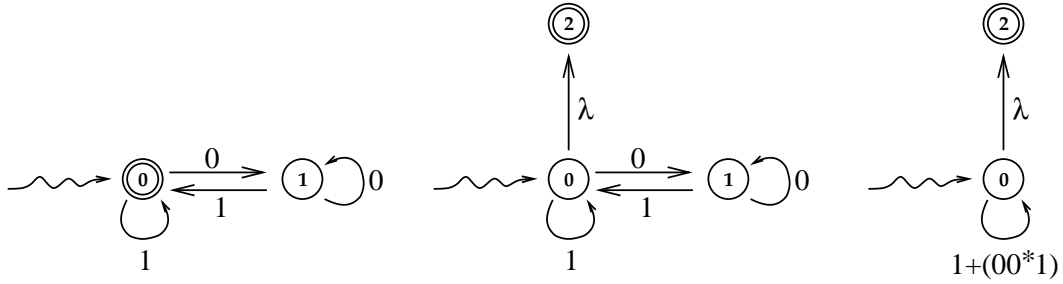


We now eliminate State 1 using Rule 4.



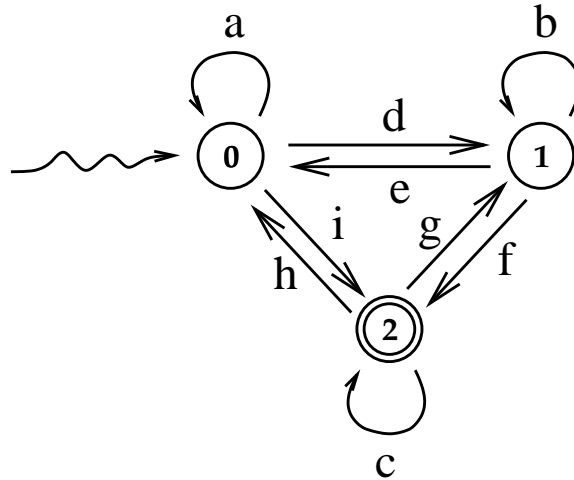
Using Rule 3, we obtain $\lambda + (a + bb)(b + ab + abb)^*a$, the regular expression for the initial NFA.

2. In this example, there is only one final state, but it is the start state. Introduce a new final state and a λ transition from the start state to the final state. Then, eliminate State 1 using Rule 4.



We obtain the regular expression, $(1 + (00 * 1))^*$ by Rule 3. Why didn't we write $(1 + (00^*))^* \lambda$?

3. Finally, we consider the universal example for three states.



Applying the rules, we obtain an equivalent regular expression

$$(aic^*h)^*(d + ic^*g)(b + fc^*g + (e + fc^*h)(a + ic^*h)^*(d + ic^*g))^*$$