Talen en Automaten
Assignment 1

November 22, 2017

Exercise 1

a). f: $A^* \rightarrow A^*$
$f(\lambda) = \lambda$
f(aw) = f(w)
f(bw) = b f(w)
f(cw) = c f(w)

b). 1. $f(f(\lambda)) = \lambda$ $f(\lambda) = \lambda$

2. f(f(w)) = f(w) (IH)

3. - f(f(xw)) = f(x f(w)) = x f(w) if $x \neq a$
   - f(xw) = x f(w) if $x \neq a$
   - f(f(xw)) = f(f(w)) and f(f(w)) $=^{IH}$ f(w) if x = a
   - f(xw) = f(w) if x = a

Exercise 2

a). (a) abba $\in L_1, L_2, L_3$

(b) abbba $\notin L_1, L_2, L_3$

b). If there exists a word that is in a language, but doesn't exist in a different language, the two languages have to be different:

1. abbaabba $\in L_1$, abbaabba $\notin L_2$,
2. abbabba $\in L_3$, abbabba $\notin L_1$
3. abbaabba $\in L_3$, abbaabba $\notin L_2$

c). If there exists a word in {a, b}*, which doesn't exist in L((b*a)* + b*) then the two languages have to be different:

- babb $\in$ {a, b}
- babb $\notin$ L((b*a)* + b*)

so the language L isn't equal to {a, b}*.

Exercise 3

a). L = {(ba*b + a)*a}

b). L = {((DU)* + (UD)*)*}