

Exercise Sheet 6: Observability**Problem 14:**

Let $\Sigma = \{\alpha, \beta, a, b\}$, $\Sigma_c = \Sigma$ and $\Sigma_o = \{\alpha, \beta\}$. Consider $L(G) = \{\alpha, \beta, a\alpha, b\alpha\}$ and $K = \{\alpha, a\alpha\}$.

- a. Verify that K is observable for $L(G)$, Σ_c and Σ_o .
- b. Determine a supervisor S under partial observation for K and G

Problem 15:

Let $L_m(G) = \{u_1\alpha\beta, u_1\alpha\gamma, u_2\alpha\gamma\}$ with $\Sigma_c = \Sigma$ and $\Sigma_{uo} = \{u_1, u_2\}$.

- a. Consider $K_1 = L(G) \setminus \{u_2\alpha\gamma\}$. Determine if K_1 is observable for $L(G)$, Σ_c and Σ_o .
- b. Repeat part **a.** for language $K_2 = L(G) \setminus \{u_2, u_2\alpha, u_2\alpha\gamma\}$.
- c. Determine a supervisor S under partial observation for K_2 and G

Problem 16:

Consider the plant G , a language $K \subseteq L(G)$. and the natural projection $p : \Sigma^* \rightarrow \Sigma_o^*$. Show that the language

$$p^{-1}p(K) \cap L(G)$$

is observable for G , all choices of $\Sigma_c \subseteq \Sigma$ and Σ_o .