

Example exercise 1

Tuesday, 28 April 2020

15.01

By using SOS rules for CCS, prove the existence of the following transition (assume $A \stackrel{\text{def}}{=} a.A$).

$$((A \mid \bar{a}.Nil) + A) \setminus \{a\} \xrightarrow{\tau} (A \mid Nil) \setminus \{a\}$$

Solution:

$$\begin{array}{c} \text{(ACT)} \frac{}{a.A \xrightarrow{a} A} \\ \text{(CON)} \frac{}{A \xrightarrow{a} A} \quad A \stackrel{\text{def}}{=} a.A \quad \frac{}{\bar{a}.Nil \xrightarrow{\bar{a}} Nil} \text{(ACT)} \\ \text{(COM}_3\text{)} \frac{}{A \mid \bar{a}.Nil \xrightarrow{\tau} A \mid Nil} \\ \text{(SUM}_1\text{)} \frac{}{(A \mid \bar{a}.Nil) + A \xrightarrow{\tau} A \mid Nil} \\ \text{(RES)} \frac{}{((A \mid \bar{a}.Nil) + A) \setminus \{a\} \xrightarrow{\tau} (A \mid Nil) \setminus \{a\}} \quad \tau \notin \{a\} \end{array}$$

Tips: derivations can be more easily constructed bottom-up, by letting us guide by the structure of the term on the left hand side of the transition.