

Exchangement Lemma (Lemma 4.3.2)

If the following SLD resolution steps are possible

$$\begin{array}{l}
 \{\neg A_1, \dots, \underline{\neg A_i}, \dots, \neg A_j, \dots, \neg A_k\} \quad \{\underline{B}, \neg C_1, \dots, \neg C_n\} \\
 | \quad \text{-----} \\
 \sigma_1(\{\neg A_1, \dots, \neg C_1, \dots, \neg C_n, \dots, \underline{\neg A_j}, \dots, \neg A_k\}) \quad \{\underline{D}, \neg E_1, \dots, \neg E_m\} \\
 | \quad \text{-----} \\
 \sigma_2(\sigma_1(\{\neg A_1, \dots, \neg C_1, \dots, \neg C_n, \dots, \neg E_1, \dots, \neg E_m, \dots, \neg A_k\}))
 \end{array}$$

then the following SLD resolution steps are possible as well:

$$\begin{array}{l}
 \{\neg A_1, \dots, \neg A_i, \dots, \underline{\neg A_j}, \dots, \neg A_k\} \quad \{\underline{D}, \neg E_1, \dots, \neg E_m\} \\
 | \quad \text{-----} \\
 \sigma'_1(\{\neg A_1, \dots, \underline{\neg A_i}, \dots, \neg E_1, \dots, \neg E_m \dots, \neg A_k\}) \quad \{\underline{B}, \neg C_1, \dots, \neg C_n\} \\
 | \quad \text{-----} \\
 \sigma'_2(\sigma'_1(\{\neg A_1, \dots, \neg C_1, \dots, \neg C_n, \dots, \neg E_1, \dots, \neg E_m, \dots, \neg A_k\}))
 \end{array}$$

Here, $\sigma'_2 \circ \sigma'_1 = \nu \circ \sigma_2 \circ \sigma_1$ for a variable renaming ν .