CS3231 Tutorial 2

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Prove or disprove

$$L((R + S)^*) = L((R^* S^*)^*)$$

Solution:

Suppose string $w \in L(R + S)$, $w = t_1 t_2 t_3 ... t_n$, for some $n \in \mathbb{N}, t_i \in R \vee t_i \in S$. Which fits the definition of $L(R^* S^*)$ since both accept arbituary combination of $s \in S$ and $r \in R$, or arbituary length $n \in \mathbb{N}$.
Therefore, $L(R + S) \subseteq L(R^* S^*)$

Now suppose string $u \in L(R^* S^*)$, $u = k_1 k_2 k_3 ... k_n$, for some $n \in \mathbb{N}$, $k_i \in R^* \vee k_i \in S^*$. Which fits the definition of $L(R + S)$ for the same reason above.

$$L(S(R + S)^* S) = L((SR^* S)^+)$$

Solution: