$\Sigma = \{0,1\} \qquad 1^* \qquad (1+0)^* \qquad 0^*+1^* \qquad (0+1)^*$

$$\mathcal{L}(1^*) = \mathcal{L}(1)^* = \{1\}^* = \{\varepsilon, 1, 11, 111, \ldots\}$$

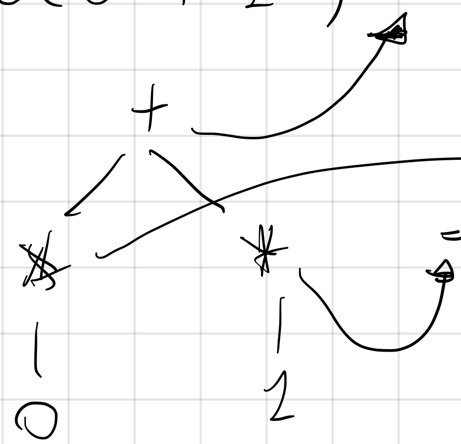
$$= \{1^n \mid n \geq 0\}$$

$$\mathcal{L}((1+0)^*) = \mathcal{L}(0+1)^* = (\mathcal{L}(0) \cup \mathcal{L}(1))^* =$$

$$= (\{0\} \cup \{1\})^* = (\{0,1\})^*$$

$$= \{\varepsilon, 0, 1, 00, 01, 10, 11, 000, 001, 010, 011, 100, 101, 110, 111, \ldots\}$$

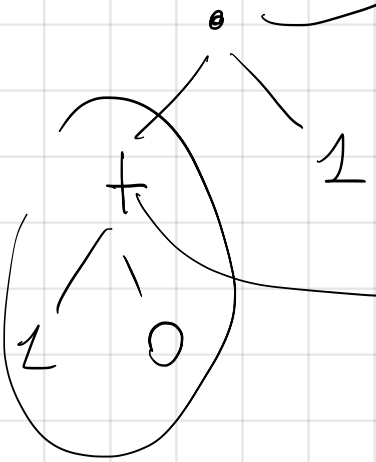
$$\mathcal{L}(0^*+1^*) = \mathcal{L}(0^*) \cup \mathcal{L}(1^*) = \mathcal{L}(0)^* \cup \mathcal{L}(1^*)$$



$$= \mathcal{L}(0)^* \cup \mathcal{L}(1)^* = \{0\}^* \cup \{1\}^* =$$

$$= \{0^n \mid n \geq 0\} \cup \{1^n \mid n \geq 0\}$$

$$\mathcal{L}((1+0)1) = \mathcal{L}(0+1) \odot \mathcal{L}(1) = (\mathcal{L}(0) \cup \mathcal{L}(1)) \odot \mathcal{L}(1)$$



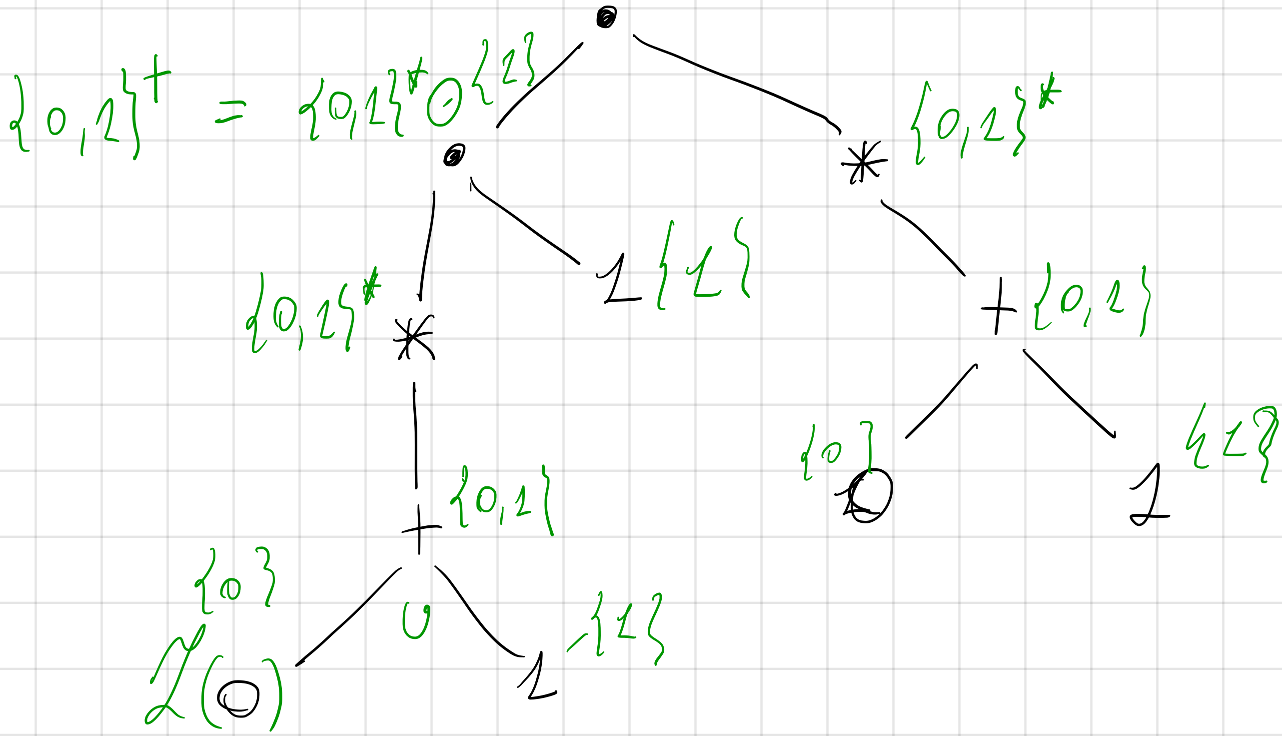
$$= (\{0\} \cup \{1\}) \odot \{1\} =$$

$$= \{0,1\} \odot \{1\} = \{01, 11\}$$

No because of ε

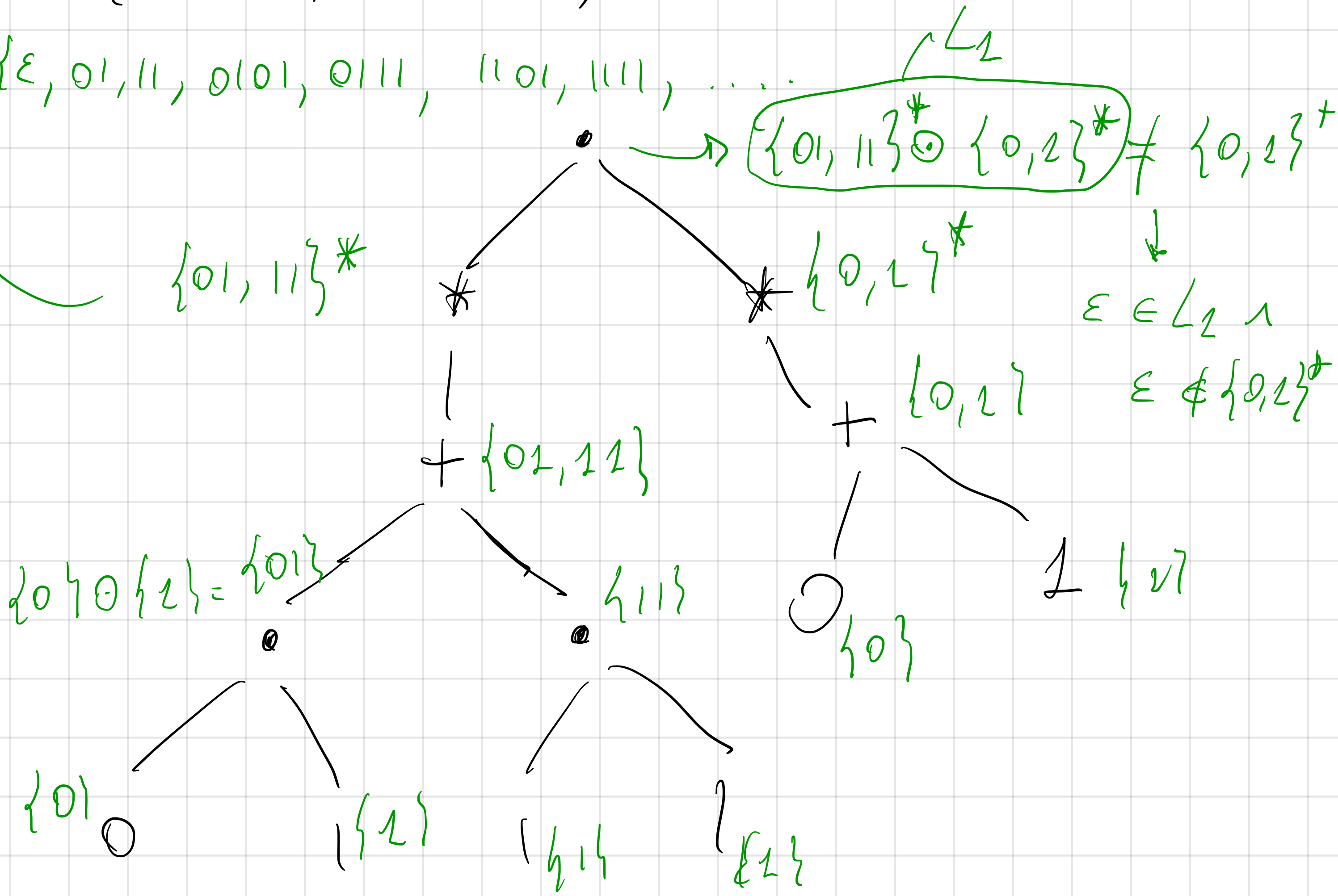
$$(0+1)^* 1 (0+1)^* \overset{?}{\equiv} (01+11)^* (0+1)^*$$

$$\mathcal{L}((0+1)^* 1 (0+1)^*) = \{0,1\}^+ \odot \{0,1\}^* = \{0,1\}^+$$



$\mathcal{L}((01+11)^*(0+1)^*) =$

$= \{\varepsilon, 01, 11, 0101, 0111, 1101, 1111, \ldots$



Let $L_1 = \{01, 11\}^* \odot \{0,1\}^* = \{0,1\}^*$!

$L_2 = \{0,1\}^+$

is $L_1 = L_2$? No. Counterexample:

$\varepsilon \in L_1 \wedge \varepsilon \notin L_2$

$0 \in L_1$ because $0 = \varepsilon \cdot 0$

$10 \in L_1$ because $\varepsilon \cdot 10 = 10$