

# Calcul derivative

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$$e = b(a+c)^* b(aa+cc)^*$$

$$\delta_b \left( \underbrace{b(a+c)^*}_{e_1} \underbrace{b(aa+cc)^*}_{e_2} \right) =$$

$$\delta_b(e_1 e_2) = \delta_b(e_1) e_2 + \varepsilon?(e_1) \delta_b(e_2)$$

$$\varepsilon?(e_1) = \begin{cases} \varepsilon, & \text{dacă } \varepsilon \in L(e_1) \\ \text{empty}, & \text{dacă } \varepsilon \notin L(e_1) \end{cases}$$

$$= \underbrace{\delta_b(b)}_{\varepsilon} (a+c)^* b(aa+cc)^* + \underbrace{\varepsilon?(b)}_{\text{empty}} \delta_b((a+c)^* b(aa+cc)^*)$$

$$\delta_a(b) = \begin{cases} \varepsilon, & \text{dacă } a = b \\ \text{empty}, & \text{dacă } a \neq b \end{cases}$$

$$= \varepsilon \cdot (a+c)^* b(aa+cc)^* + \text{empty} \cdot \delta_b((a+c)^* b(aa+cc)^*)$$

$$e \cdot \varepsilon = \varepsilon \cdot e = e$$

$$\text{empty} \cdot e = \text{empty}$$

$$\text{empty} + e = e$$

$$= (a+c)^* b(aa+cc)^* + \text{empty}$$

$$= (a+c)^* b(aa+cc)^*$$