1. (25 pts) Dar una expresión regular para el complemento de $L((a(ab)^*)^*)$ sobre el alfabeto $\{a, b\}$.

$L_0 = (a(ab)^*)^* \mid \lambda$ F

$\partial_a(L_0) = \partial_a((a(ab)^*)^* \mid \lambda) = \partial_a((a(ab)^*)^*) \mid \partial_a(\lambda) = \partial_a(a(ab)^*)(a(ab)^*)^* \mid \emptyset = (\partial_a(a)(ab)^* \mid \emptyset\, \cancelto{\emptyset}{\partial_a((ab)^*)})(a(ab)^*)^* = (ab)^*(a(ab)^*)^*$ ] $L_1$ F

$\partial_b(L_0) = \partial_b((a(ab)^*)^* \mid \lambda) = \partial_b((a(ab)^*)^*) \mid \partial_b(\lambda) = \partial_b(a(ab)^*)(a(ab)^*)^* \mid \emptyset = (\partial_b(\cancelto{\emptyset}{a})(ab)^* \mid \emptyset\, \partial(\cancelto{\emptyset}{(ab)^*}))(a(ab)^*)^* = T$ ]

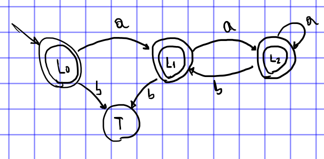
$\partial_a(L_1) = \partial_a((ab)^*(a(ab)^*)^*) = \partial_a((ab)^*)(a(ab)^*)^* \mid \lambda\, \partial_a((a(ab)^*)^*) = b(ab)^*(a(ab)^*)^* \mid (ab)^*(a(ab)^*)^* = (b \mid \lambda)(ab)^*(a(ab)^*)^*$ ] $L_2$ F

$\partial_b(L_1) = \partial_b((ab)^*(a(ab)^*)^*) = \partial_b(\cancelto{\emptyset}{(ab)^*)(a(ab)^*)^*} \mid \lambda\, \partial_b(\cancelto{\emptyset}{(a(ab)^*)^*}) = \emptyset$ ] T

$\partial_a(L_2) = \partial_a((b \mid \lambda)(ab)^*(a(ab)^*)^*) = \partial_a(b \mid \lambda)\cancelto{\emptyset}{(ab)^*(a(ab)^*)^*} \mid \lambda\, \partial_a((ab)^*(a(ab)^*)^*) = (b \mid \lambda)(ab)^*(a(ab)^*)^*$ ] $L_2$

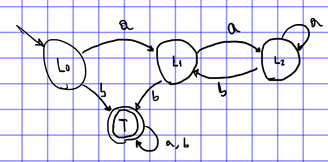
$\partial_b(L_2) = \partial_b((b \mid \lambda)(ab)^*(a(ab)^*)^*) = \partial_b(b \mid \lambda)(ab)^*(a(ab)^*)^* \mid \lambda\, \partial_b(\cancelto{\emptyset}{(ab)^*(a(ab)^*)^*}) = (\cancelto{\lambda}{\partial_b(b)} \mid \cancelto{\emptyset}{\partial_b(\lambda)})(ab)^*(a(ab)^*)^*$ ] $L_1$

A



$\Rightarrow$

$A^c$



$T = aT \mid bT \mid \lambda = (a \mid b)T \mid \lambda = (a \mid b)^*$ ]

$L_2 = aL_2 \mid bL_1 = a^* bL_1$ ]

$L_1 = aL_2 \mid bT = a^+ bL_1 \mid b(a \mid b)^* = (a^+ b)^* b(a \mid b)^*$ ]

$L_0 = aL_1 \mid bT = a(a^+ b)^* b(a \mid b)^* \mid b(a \mid b)^* = (a(a^+ b)^* \mid \lambda)\, b(a \mid b)^*$ ]