

## TD n°5

### Algorithme de Glushkov et Méthode de Brzozowski–McCluskey

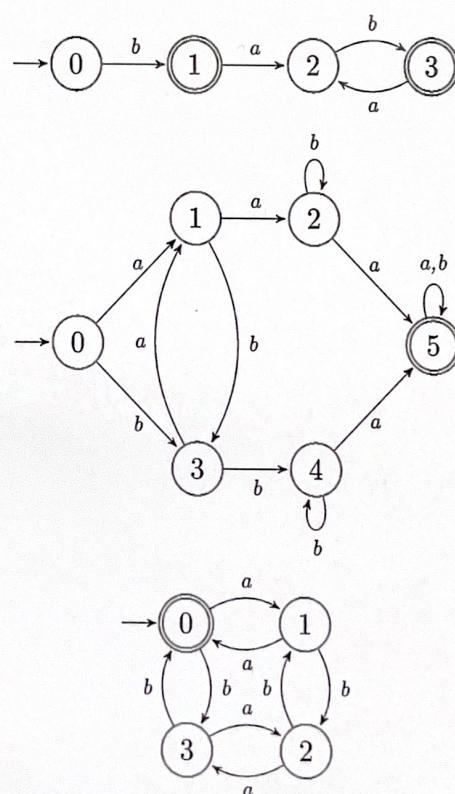
#### De l’Expression Rationnelle à l’Automate - Algorithme de Glushkov

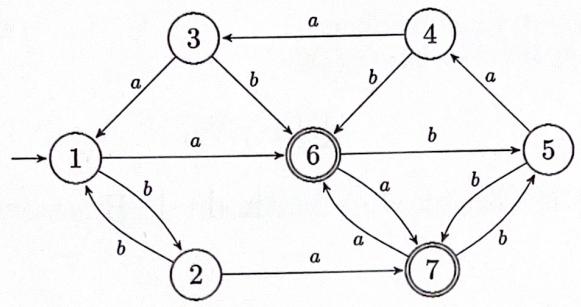
**Exercice 1** Utiliser l’algorithme de Glushkov pour trouver des automates reconnaissant les langages décrits par les expressions rationnelles suivantes. Les exercices notés (\*) sont facultatifs.

- $E_1 = (a + ba + bba)^*$ ,
- $E_2 = (a + ba + bba)^*(\epsilon + b + bb)$ ,
- $E_3 = (aa + b)^*$ ,
- $E_4 = (aa + b)^*(a + bb)^*$ ,
- $E_5 = (aa + bb + (ab + ba))(aa + bb)^*(ab + ba)^*$ .
- (\*)  $E_6 = (a^*b^*)^*$ ,
- $E_7 = b(ab)^* + (ba)^*b$ ,
- (\*)  $E_8 = (a + bb)^*(b + aa)^*$ .

#### De l’Automate à l’Expression Rationnelle - Méthode de Brzozowski–McCluskey

**Exercice 2** Pour chacun des automates ci-dessous, calculer une expression rationnelle pour le langage reconnu, en appliquant la méthode de Brzozowski–McCluskey.





Ex 1

$$E_1 = (aa + b)^* (a + bb)^*$$

$$\text{fin } (a_1 a_2 + b_3)^* (a_4 + b_5 b_6)^*$$

$$e \in L(e')$$

$$\text{first}(e') = \{a_1, b_3, a_4, b_5\}$$

$$\text{last}(e') = \{a_2, b_3, a_4, b_6\}$$

dr next- $\{a_1 a_2\}$

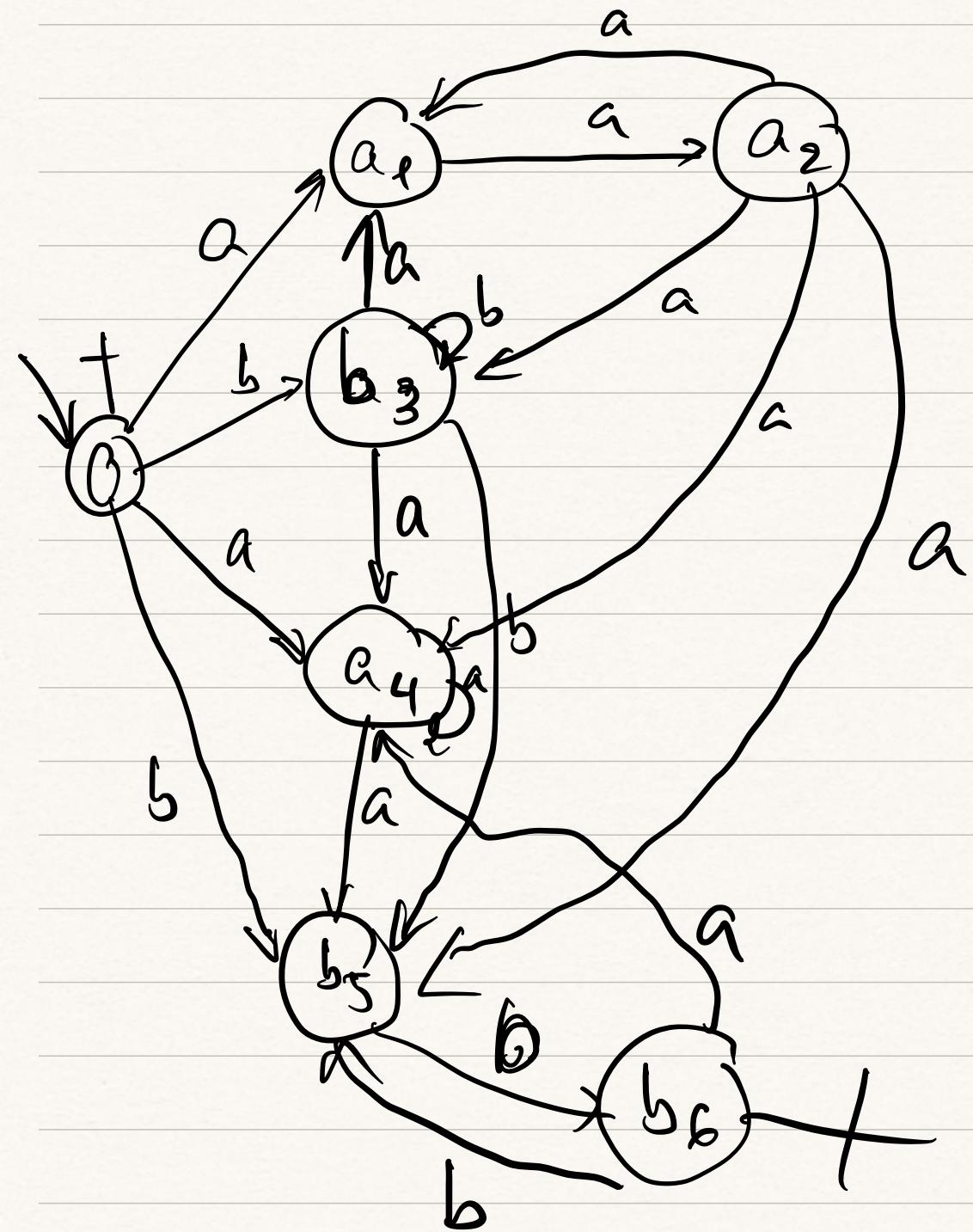
$$(a_2 a_1) (a_2 a_4) (a_2 b_3) (a_2 b_5)$$

$$(b_3 a_1) (b_3 b_3) (b_3 a_4) (b_3 b_5)$$

$$(a_4 a_1) (a_4 a_4)$$

$(b_5 \ b_6)$

$(b_6 \ a_4)$      $(b_6 \ b_5)$



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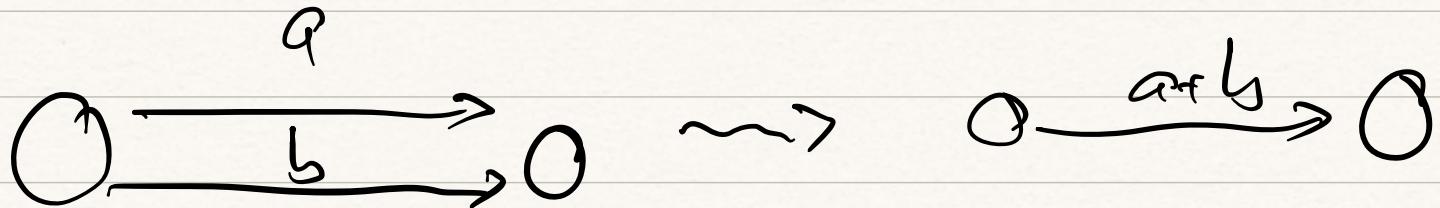
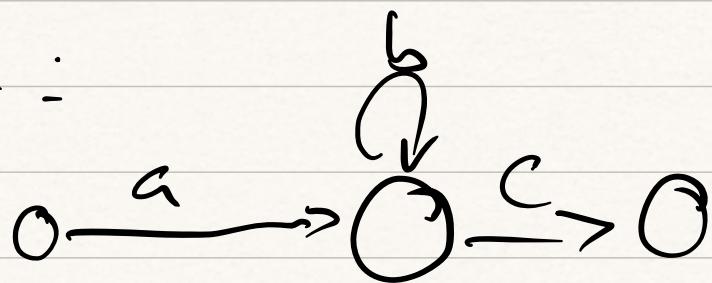
8h 30

Algorithm:

Automate : FR :- Buzoowski - McMillan  
- Leinweber & Aeeden

BM

BM :

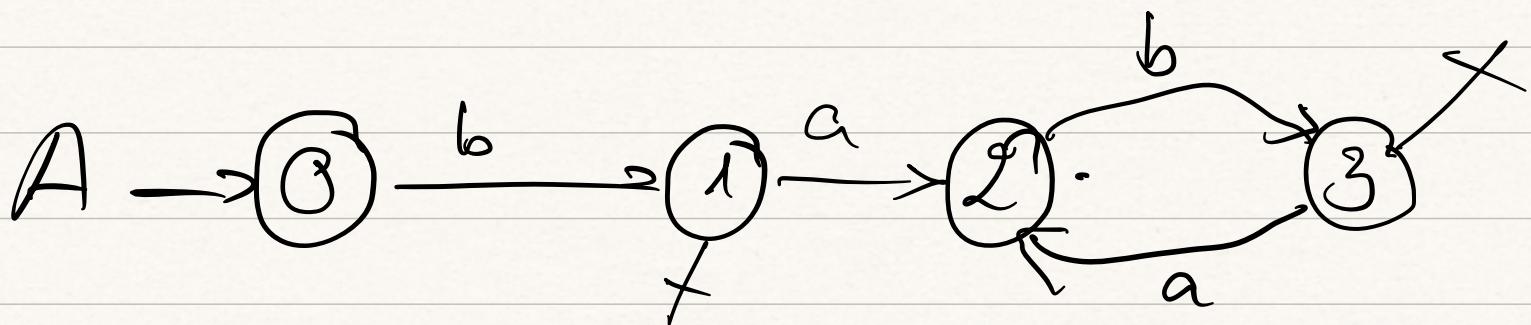


△ Invariants / Condition

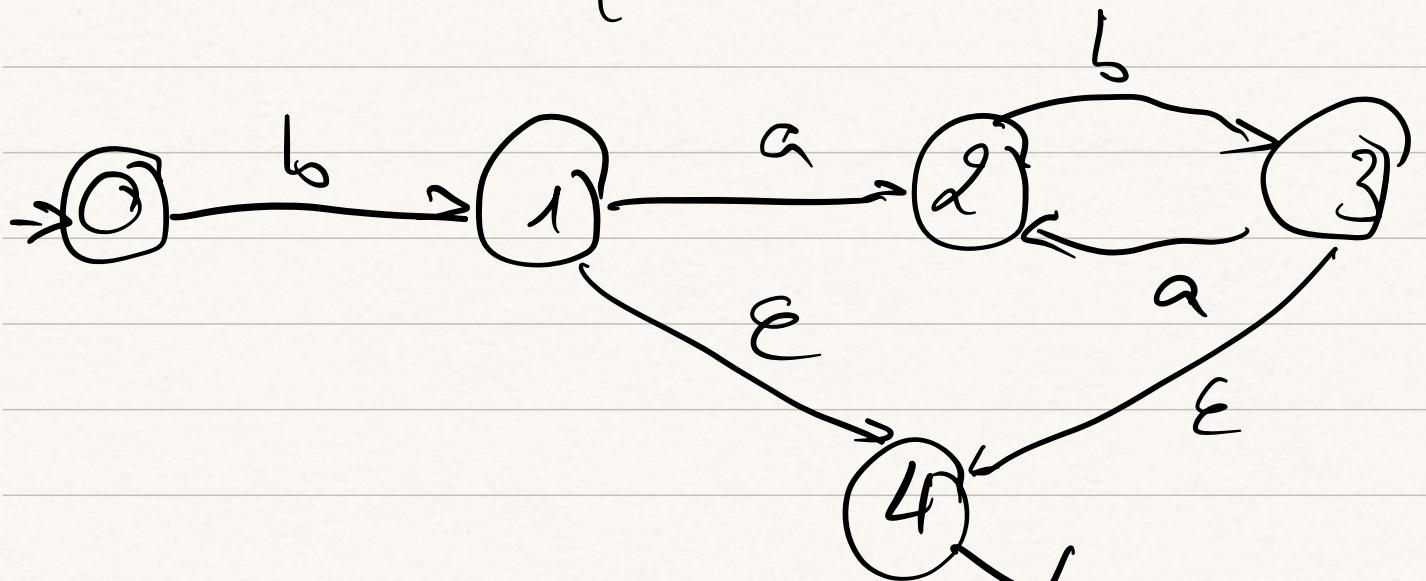
- un seul état initial
- une flèche entrante dans l'état initial
- un seul état final
- une flèche sortante de l'état final
- L'état initial n'est pas final

Si l'automate initial ne satisfait pas ces conditions, modifiez-le !

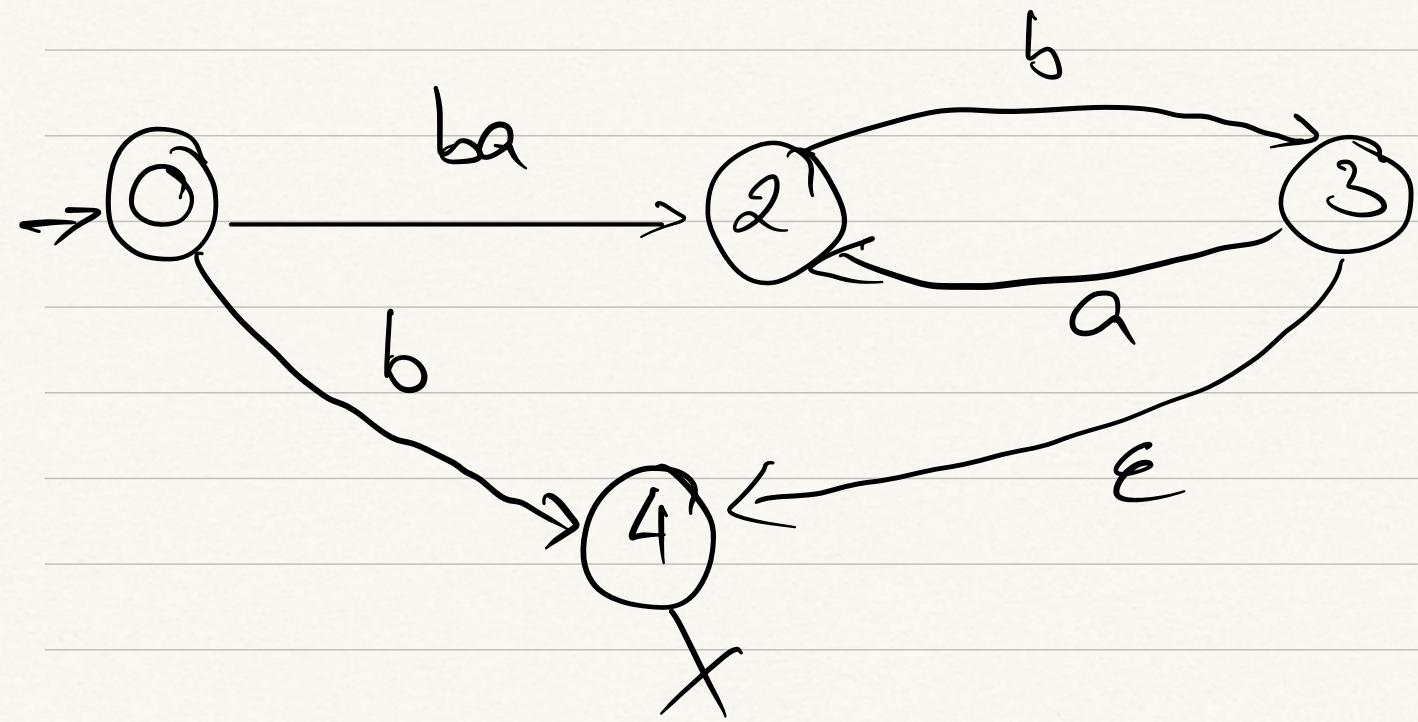
## TD5 ex 2



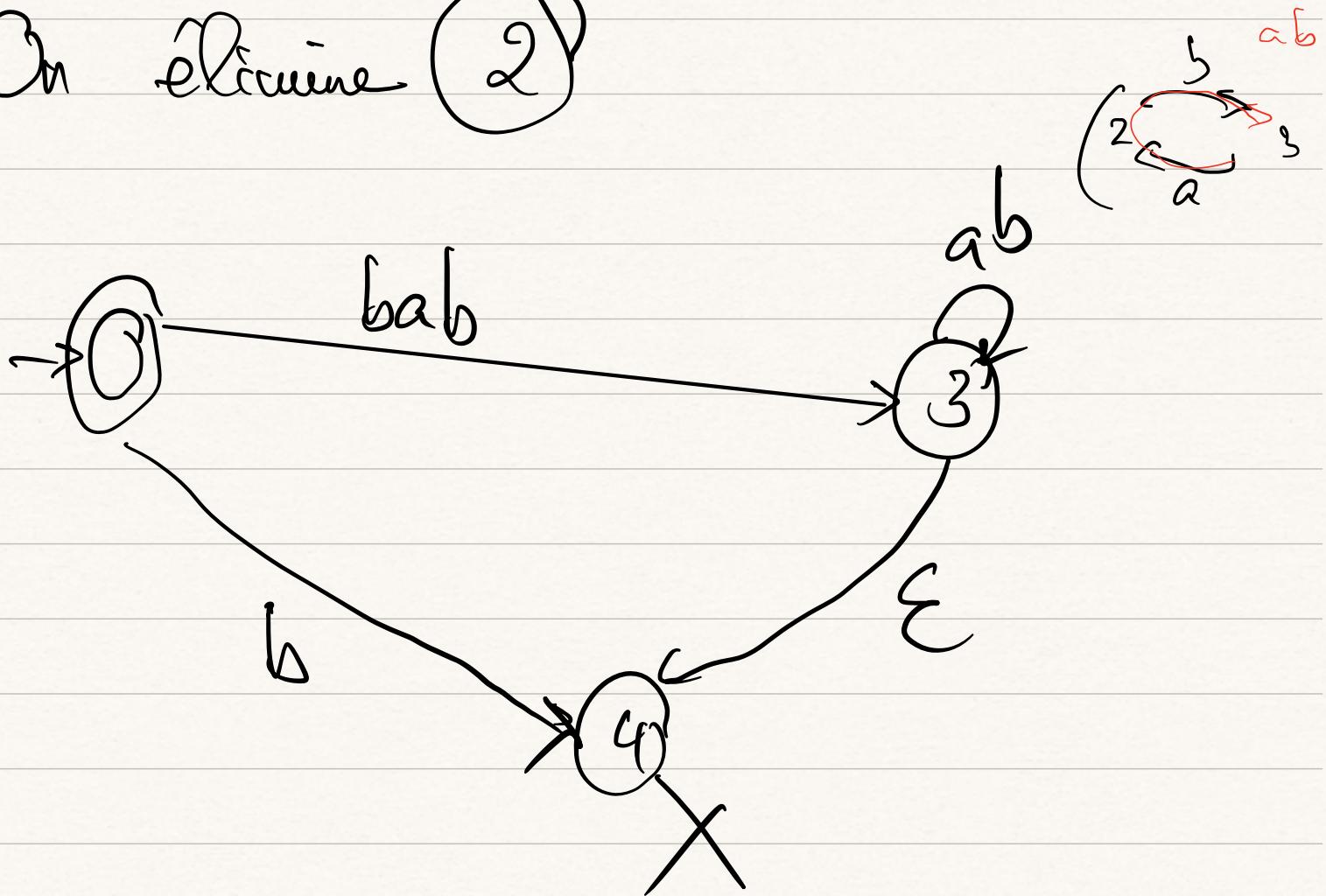
A ne satisfait pas les conditions de BM, on le modifier



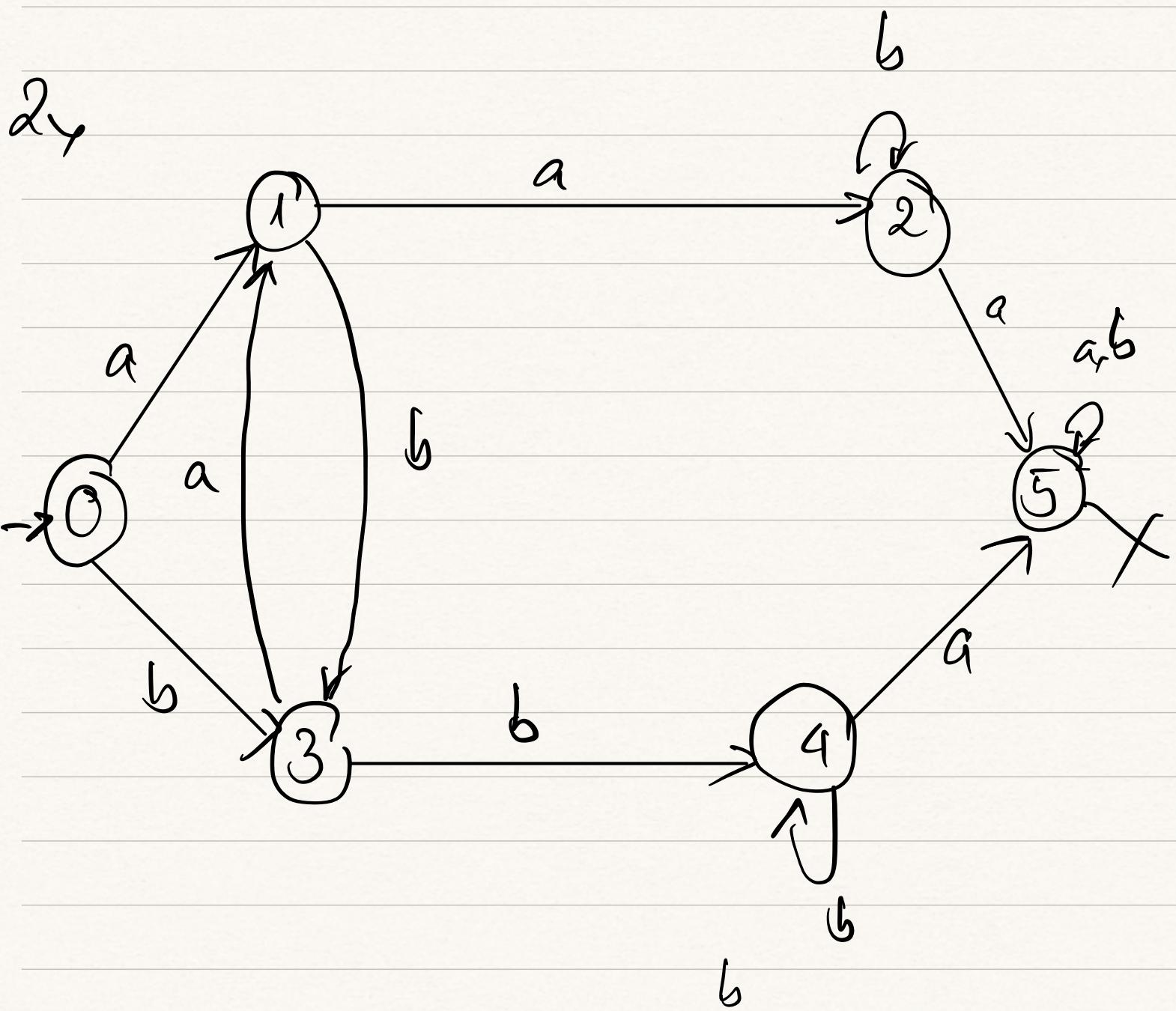
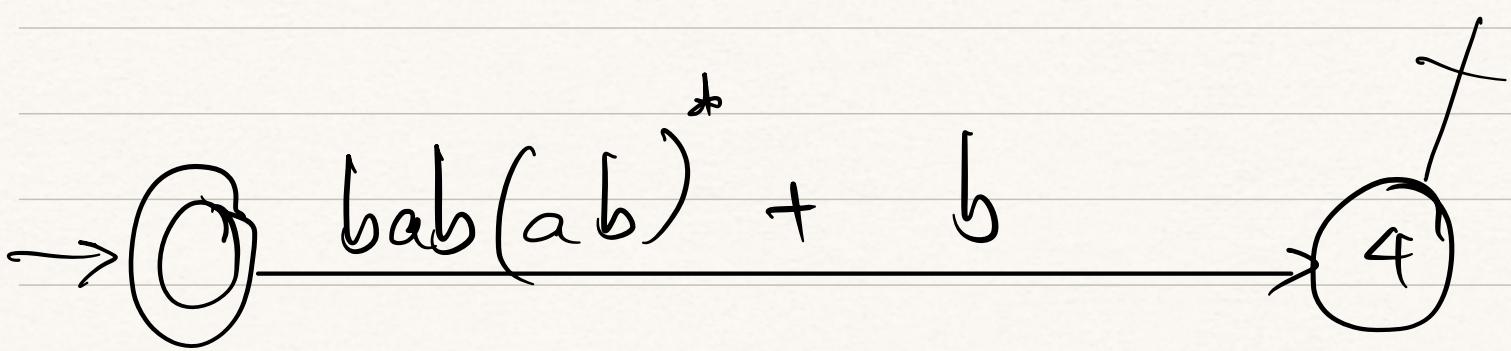
On élucine ①

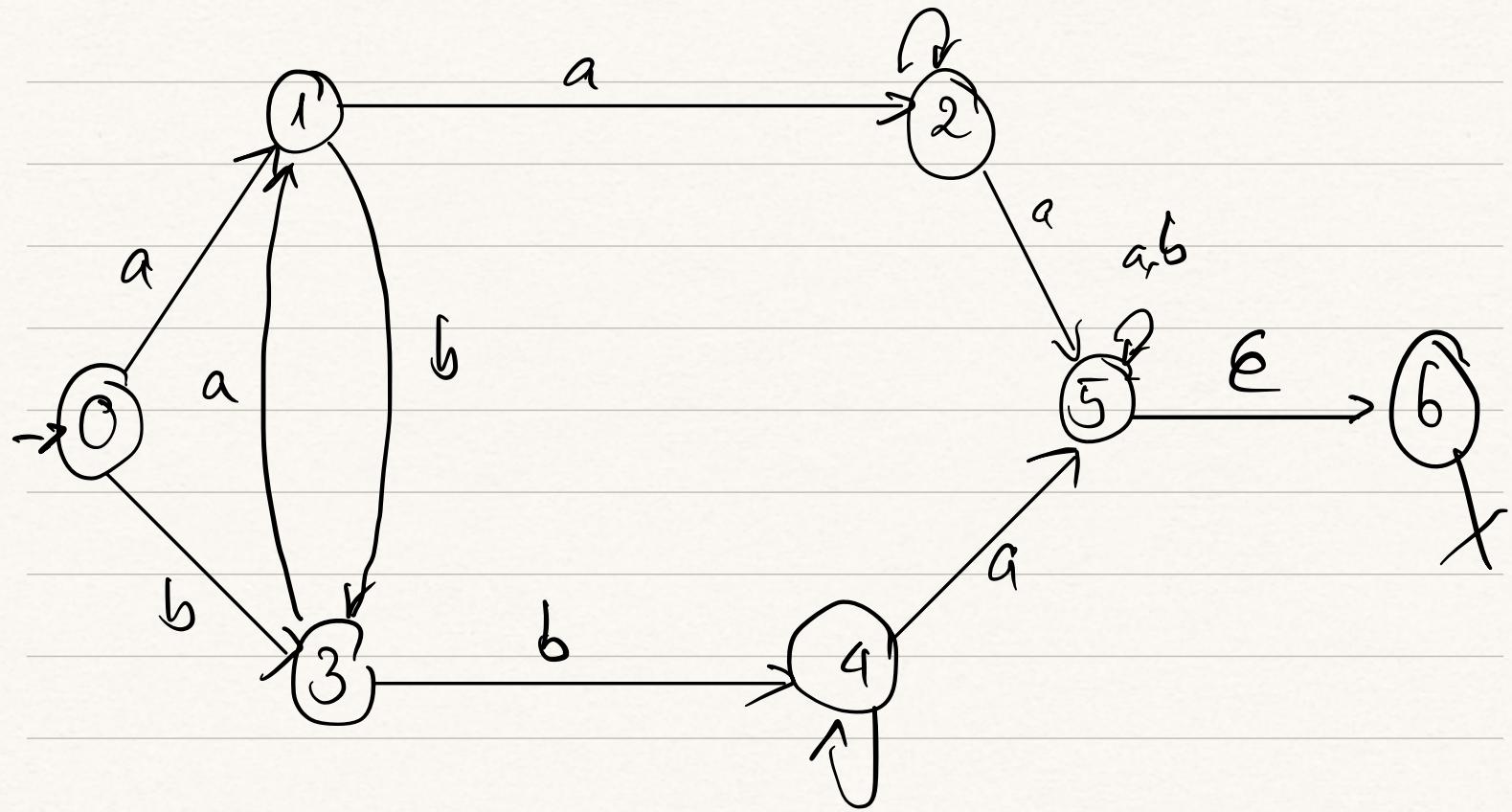


On élucine ②

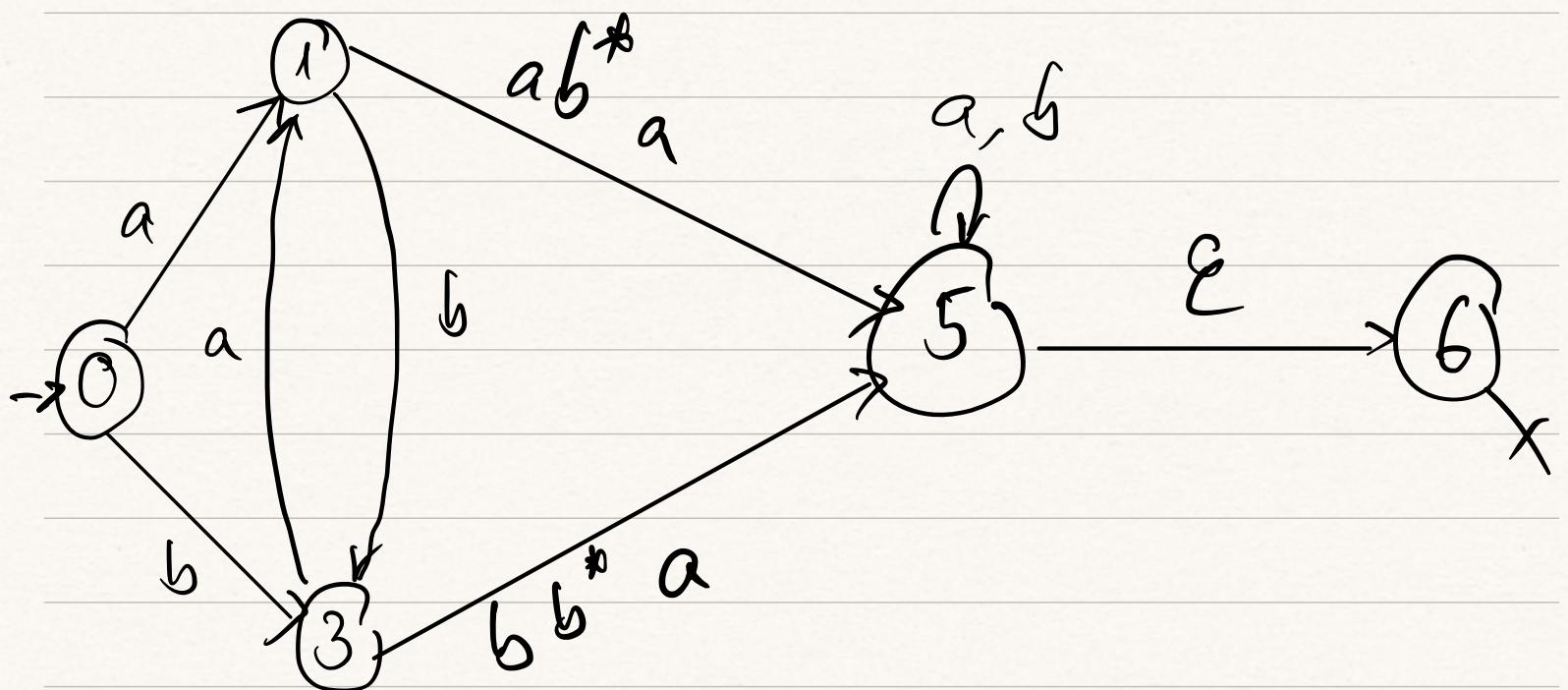


On élmine ③



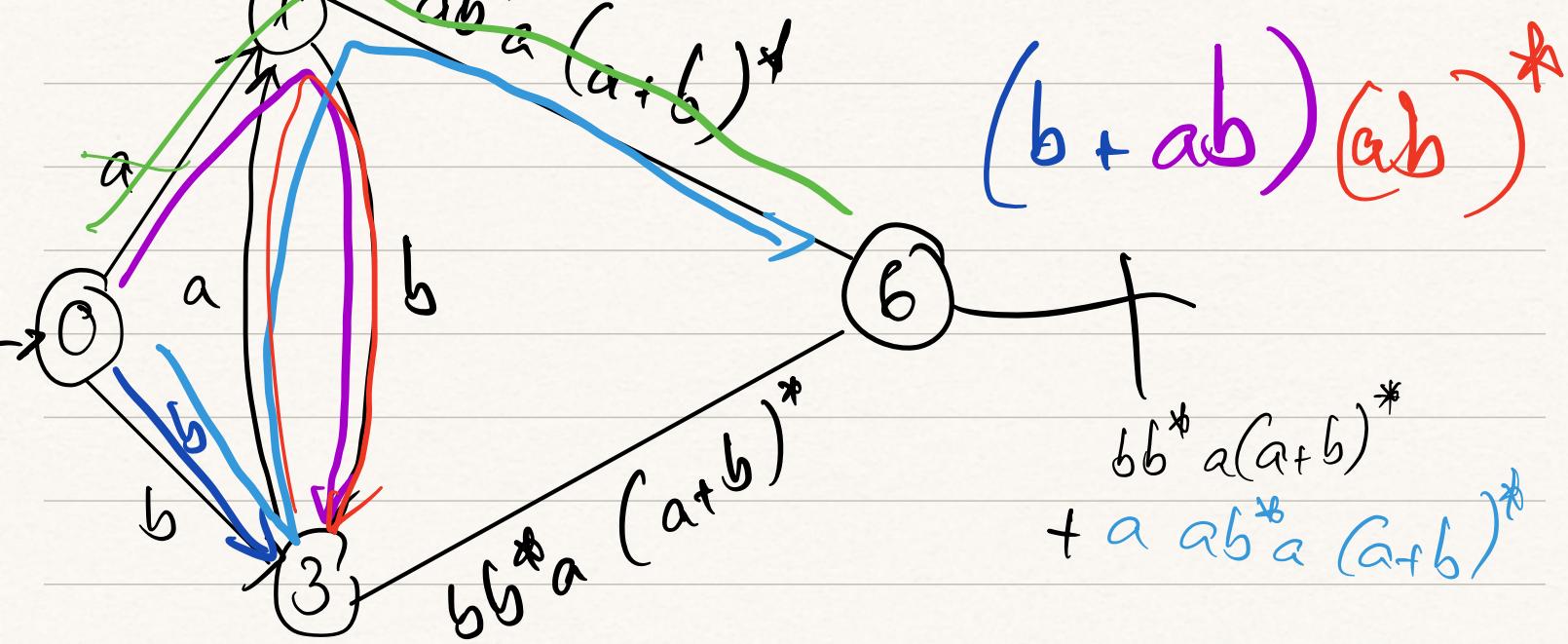


On élucine 2 et 4 <sup>b</sup>

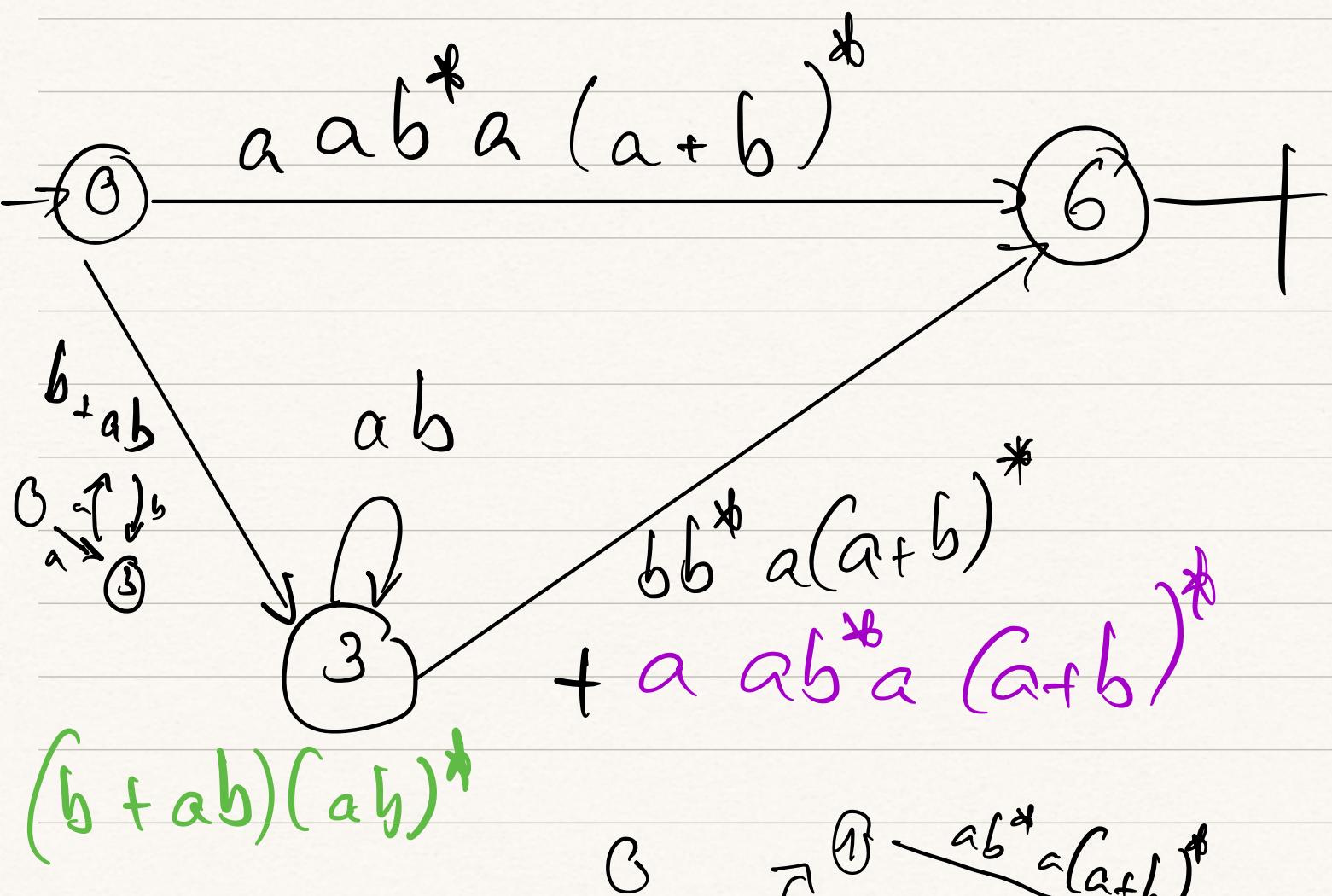


On élucine ⑤

$aab^*a(a+b)^*$



On élimine ①



3  
b  
a

On explique ③

$$aab^*a(a+b)^* + (b+ab)(ab)^*$$

$$+ ((b+aa)b^* a(a+b)^*)$$

$$b \left[ b^* a (a+b)^* \right] + a ab^* a (a+b)^*$$

$$(b+aa) \left( b^* a (a+b)^* \right)$$