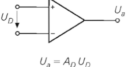
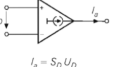
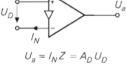
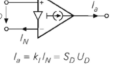
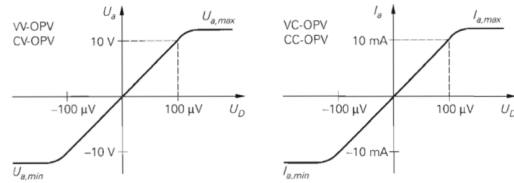


# 1 Opamp 1

## 1.1 Catégories d'AOP idéaux

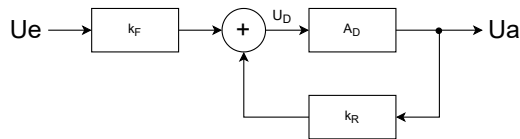
Voltage controlled voltage source	Voltage output	Current output
	Normal opamp VV-opamp  $U_a = A_D U_D$	Transconductance opamp VC-opamp  $I_a = S_D U_D$
Current controlled voltage source	Transimpedance opamp CV-opamp  $U_a = I_N Z = A_D U_D$	Current opamp CC-opamp  $I_a = k_I I_N = S_D U_D$

## 1.2 Caractéristique de transfert



- gain idéal infini
- $U_{out}$  limité aux tensions d'alimentation

## 1.3 Control loop diagram



- $U_D = k_F U_e - k_R U_a$
- $A = \frac{U_a}{U_e} = \frac{k_F A_D}{1 + k_R A_D} \cong \frac{k_F}{k_R}$  (pour  $A_D$  grand)

### 1.3.1 non-inverseur

- $k_F = 1$

$$k_R = \frac{R_1}{R_1 + R_N}$$

$$A = 1 + \frac{R_N}{R_1}$$

$R_N$  est la résistance de contre réaction et  $R_1$  la résistance mise à la masse.

### 1.3.2 inverseur

$$k_F = \frac{-R_N}{R_1 + R_N}$$

$$k_R = \frac{R_1}{R_1 + R_N}$$

$$A_D = \frac{U_a}{k_F U_e - k_R U_a}$$

$$A = k_F \frac{A_D}{1 + k_R A_D}$$

### 1.3.3 différentiel

$$k_F = \frac{R_1}{R_1 + R_2}$$

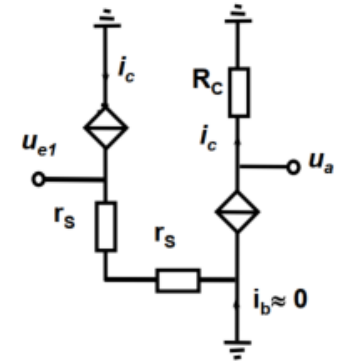
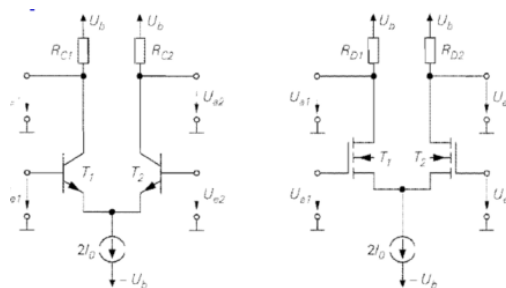
$$k_R = \frac{R_2}{R_1 + R_2}$$

$$A = \frac{R_1 A_D}{R_1 + R_2 + R_2 A_D} \cong \frac{R_1}{R_2} \text{ (pour } A_D \text{ grand)}$$

$R_1$  contre réaction et résistance à la masse /  $R_2$  résistance d'entrée (+ et -)

## 1.4 Montage interne AOP

### 1.4.1 Amplificateur différentiel

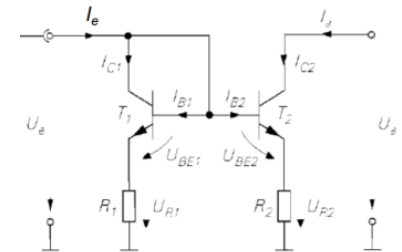


Pour les petits signaux

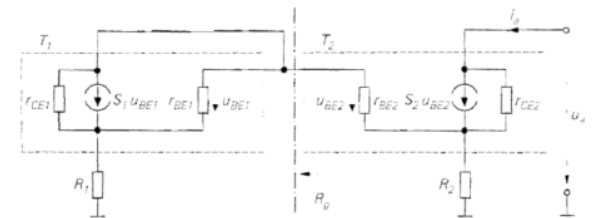
$$A_1 = \frac{R_c}{2r_s}$$

$$A_2 = \frac{-R_c}{2r_s}$$

### 1.4.2 Miroir de courant

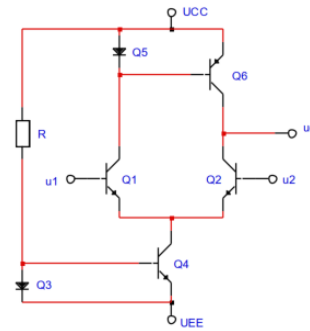


Facteur de translation de courant  $k = \frac{R_1}{R_2}$



### 1.4.3 Charge active

On utilise un miroir de courant comme charge active.



### 1.4.4 Cascode

### 1.4.5 Conversion d'impédance

### 1.4.6 Push-Pull

### 1.4.7 Darlington