

RISOLUZIONE 060718

$$I_{cOP} = \frac{I_{ee} \beta_F}{1 + \beta_F} = 2.96 \text{mA}$$

$$V_{beOP} = V_T \text{Log} \left[1 + \frac{I_{cOP}}{I_S} \right] = 660. \text{mV}$$

$$V_{inOPmax} = V_{cc} - R_c I_{cOP} + V_{beOP} - V_{cesat} = 2.55 \text{V}$$

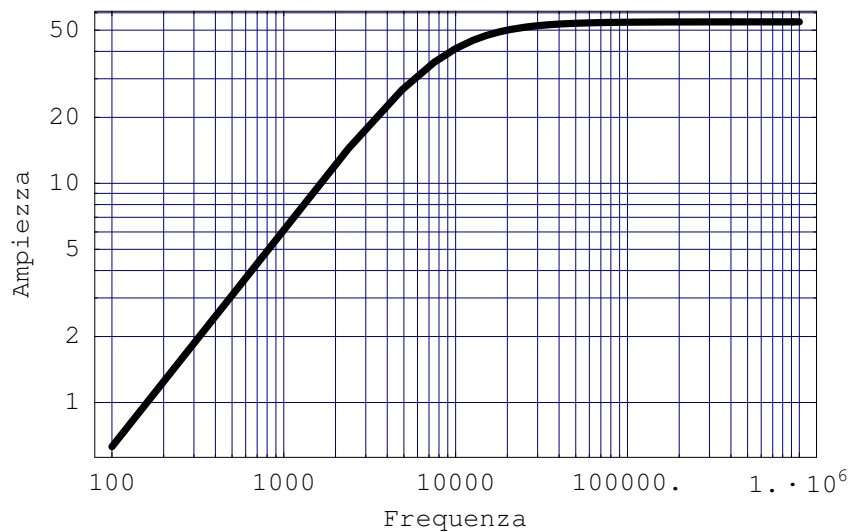
$$r_{be} = \frac{V_T \beta_F}{I_{cOP}} = 633. \Omega$$

$$Z_{in}(s) = r_{be} + (\beta_F + 1) \left(\frac{1}{s C_a} + \frac{1}{g_i} \right) = \left(1.39 + \frac{76. \times 10^3}{s} \right) \text{k}\Omega$$

$$A_v(s) = -g_f R_c \frac{s C_a}{g_i + s C_a} \frac{(\beta_F + 1) \left(\frac{1}{s C_a} + \frac{1}{g_i} \right)}{Z_{in}} =$$

$$= - \frac{600 s}{600000 + 11 s} = - \frac{s}{1000 + (18.3 \times 10^{-3}) s}$$

Uno zero nell'origine e un polo $p = -54.5 \times 10^3 \text{s}^{-1}$:



Circuito 060718

```
.options tnom=17
```

```
.temp=17
```

```
Vin 1 0
```

```
Q 3 1 2 mq
```

```
.model mq npn bf=75 is=10f
```

```
Vcc 5 0 5
```

```
Rc 5 3 1k
```

```
Iee 2 0 3m
```

```
Ca 2 4 1u
```

```
ri 4 0 10
```

```
gf out 0 4 0 0.1
```

```
R out 0 1k
```