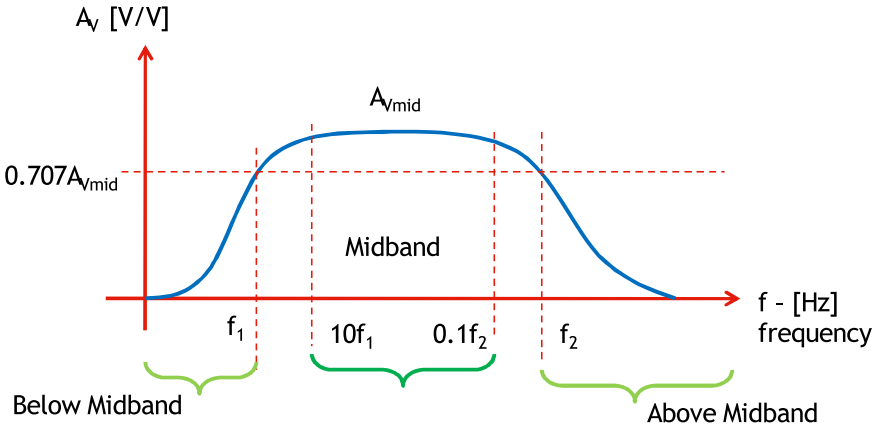
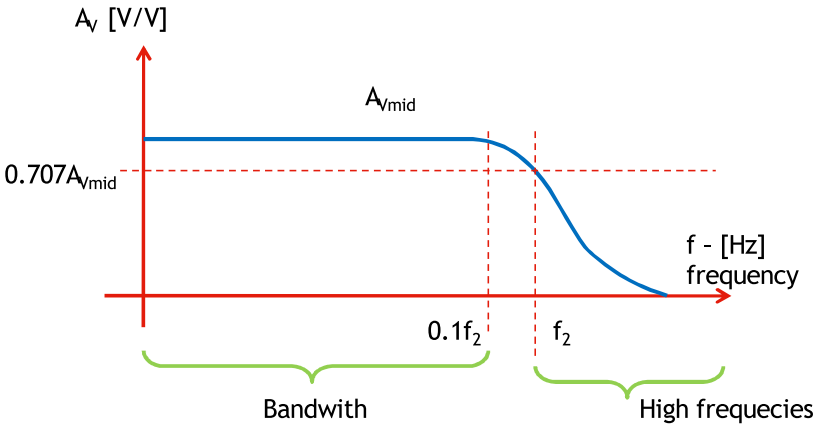


$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f_1}{f}\right)^2}} \qquad A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$

$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f_1}{f}\right)^2}\cdot\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$



$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$

$$A_P = \frac{P_{out}}{P_{in}}$$

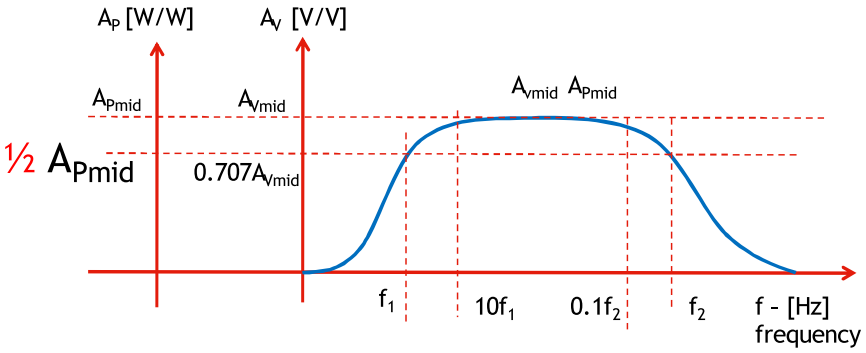
$$A_{P(dB)} = 10 \cdot log\left(\frac{P_{out}}{P_{in}}\right) = 10 \cdot log\left(A_P\right)$$

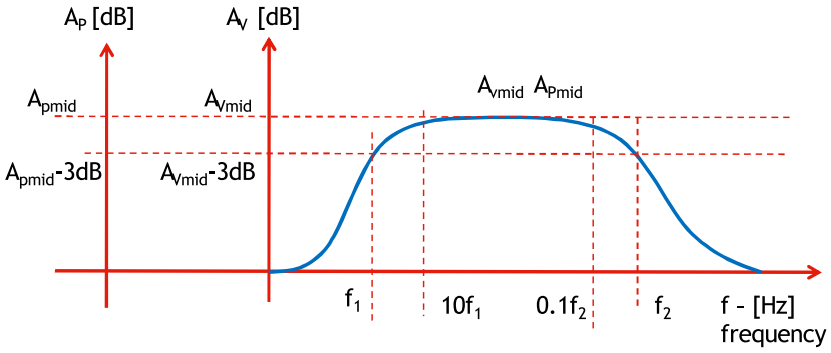
$$A_{P(dB)} = A_{P_1(dB)} + A_{P_2(dB)}$$

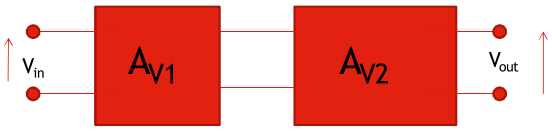
$$A_V = \frac{V_{out}}{V_{in}}$$

$$A_{V(dB)} = 20 \cdot log\left(\frac{V_{out}}{V_{in}}\right) = 20 \cdot log\left(A_V\right)$$

$$A_{V(dB)} = A_{V_1 1(dB)} + A_{V_2(dB)}$$



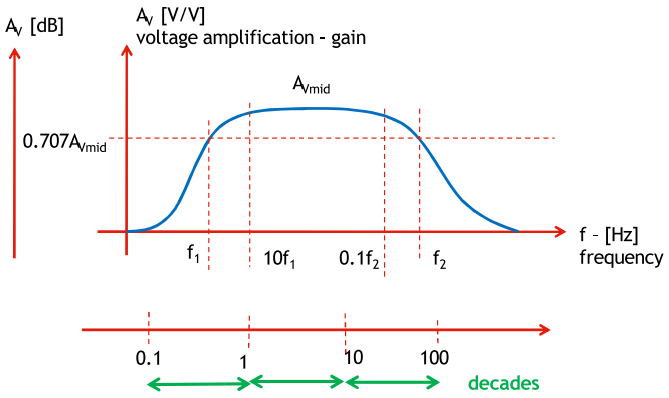


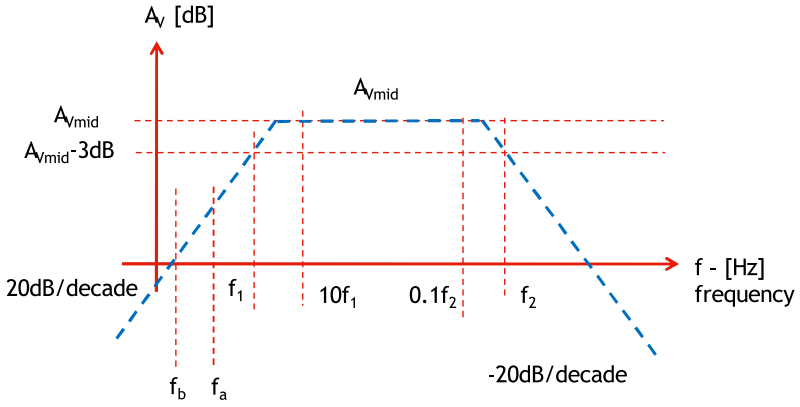


$$P\left(dBm\right) = 10 \cdot log\left(\frac{P\left(W\right)}{1\left(mW\right)}\right)$$

$$U\left(dB\mu\right) = 20 \cdot log\left(\frac{U\left(V\right)}{1\left(\mu V\right)}\right)$$

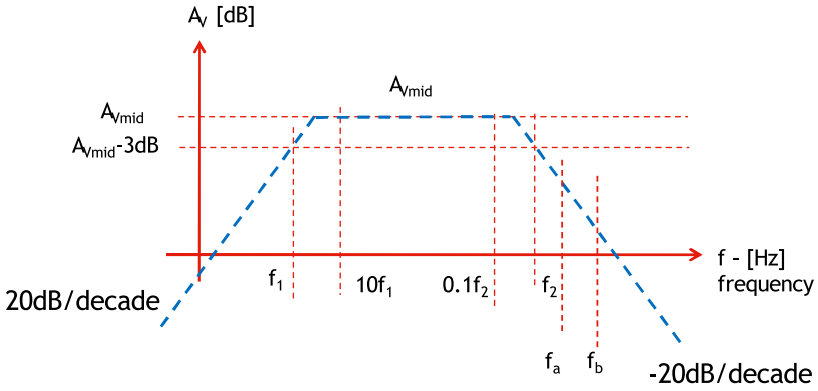
$$U\left(dBV\right) = 20 \cdot log\left(\frac{U\left(V\right)}{1\left(V\right)}\right)$$





$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f_1}{f}\right)^2}}$$

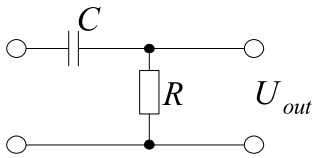
$$\frac{A_V}{dec} = 20{\cdot}log\left(\frac{A_{f_a}}{A_{f_b}}\right) = 20{\cdot}log\left(\frac{\sqrt{1+\left(\frac{f_1}{f_a}\right)^2}}{\sqrt{1+\left(\frac{f_1}{f_b}\right)^2}}\right) = 20{\cdot}log\left(\sqrt{\frac{f_a^2+f_1^2}{f_b^2+f_1^2}\cdot\frac{f_b^2}{f_a^2}}\right) \approx 20\cdot log\left(\frac{f_b}{f_a}\right) \quad f_1 >> f_a, f_b$$



$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$

$$\frac{A_V}{dec} = 20{\cdot}log\left(\frac{A_{f_a}}{A_{f_b}}\right) = 20{\cdot}log\left(\frac{\sqrt{1+\left(\frac{f_a}{f_1}\right)^2}}{\sqrt{1+\left(\frac{f_b}{f_1}\right)^2}}\right) = 20{\cdot}log\left(\sqrt{\frac{f_a^2+f_1^2}{f_b^2+f_1^2}}\right) \approx 20\cdot log\left(\frac{f_b}{f_a}\right) \quad f_1 << f_a, f_b$$

$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f_1}{f}\right)^2}}$$

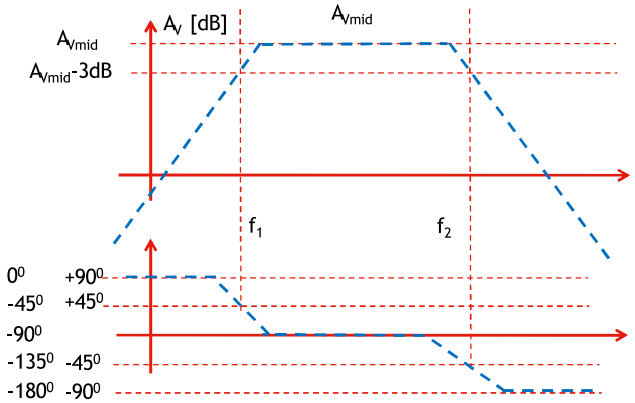


$$f_1 = \frac{1}{2\pi RC}$$

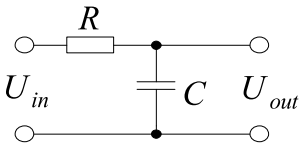
$$A_V = \frac{U_{out}}{U_{in}} = \frac{R}{R+\frac{1}{j\omega C}} = \frac{1}{1+\frac{\frac{1}{2\pi RC}}{jf}} = \frac{1}{1+\frac{f_1}{jf}}$$

$$|A_V| = \frac{1}{\sqrt{1+\left(\frac{f_1}{f}\right)^2}}$$

$$\varphi(A_V) = artg\left(\frac{f_1}{f}\right)$$



$$A_V \approx \frac{A_{Vmid}}{\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$

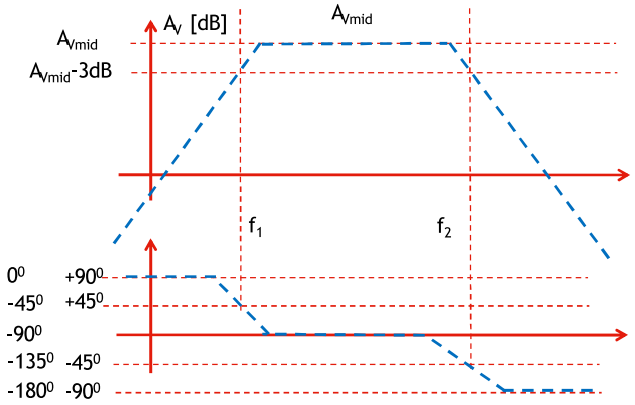


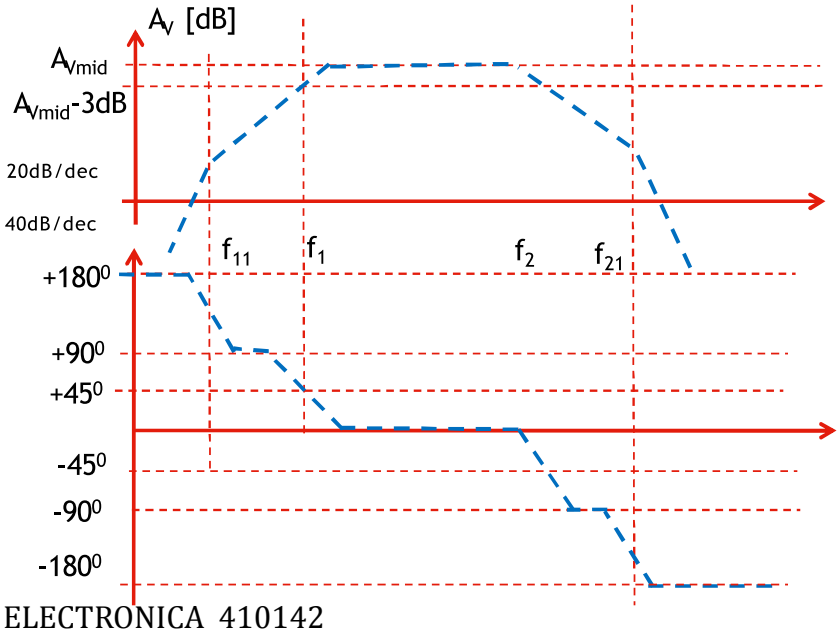
$$f_2 = \frac{1}{2\pi RC}$$

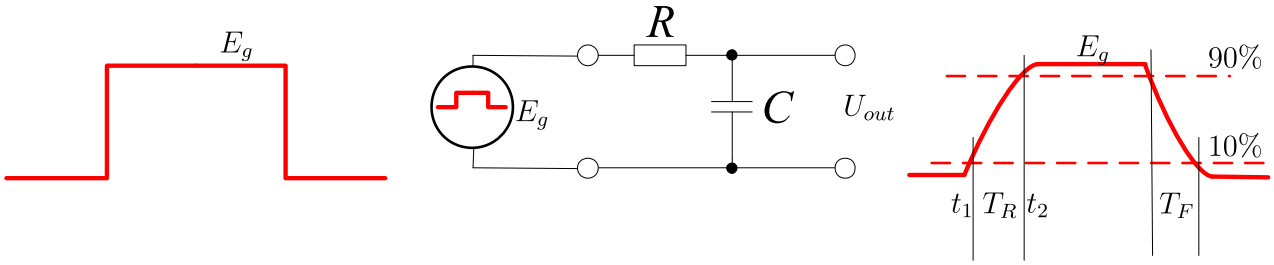
$$A_V = \frac{U_{out}}{U_{in}} = \frac{\frac{1}{j\omega C}}{R+\frac{1}{j\omega C}} = \frac{1}{1+jf\frac{1}{2\pi RC}} = \frac{1}{1+j\frac{f}{f_2}}$$

$$|A_V| = \frac{1}{\sqrt{1+\left(\frac{f}{f_2}\right)^2}}$$

$$\varphi(A_V) = -artg\left(\frac{f}{f_2}\right)$$







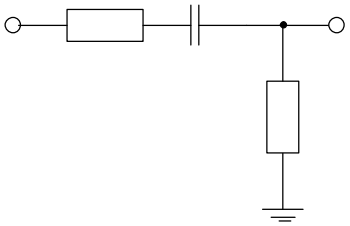
$$U_{out} = E_g\left(1 - e^{-\frac{t}{RC}}\right)$$

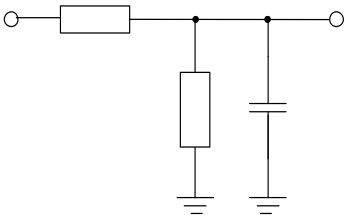
$$\left(1 - e^{-\frac{t_1}{RC}}\right) = 0.1 \Rightarrow t_1 = -RC \cdot ln\,(0.9)$$

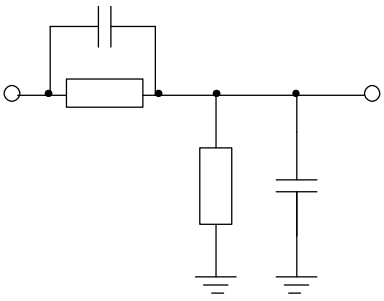
$$\left(1 - e^{-\frac{t_2}{RC}}\right) = 0.9 \Rightarrow t_2 = -RC \cdot ln\,(0.1)$$

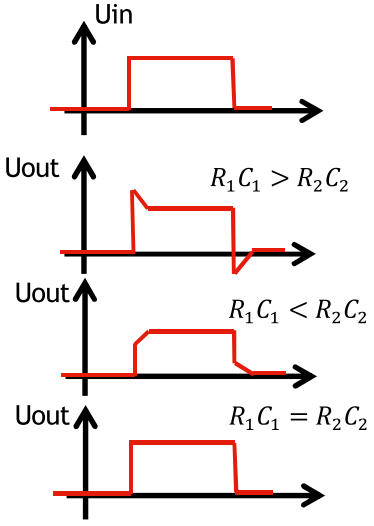
$$T_R = t_2 - t_1 = RC \cdot ln\,(9) \approx 2.2RC$$

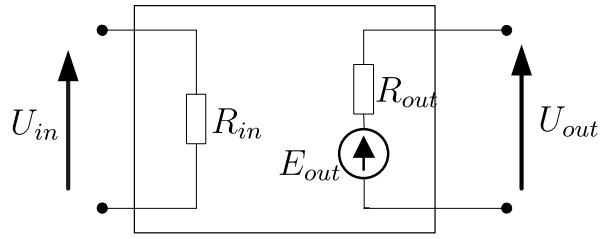
$$T_R = T_F = \frac{0.35}{f_2}$$





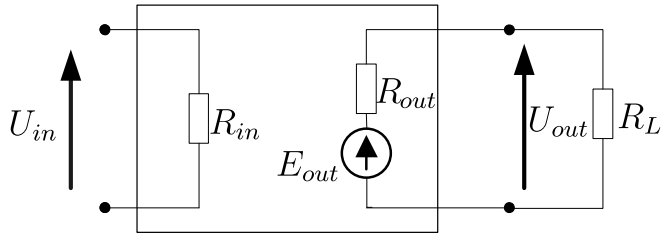




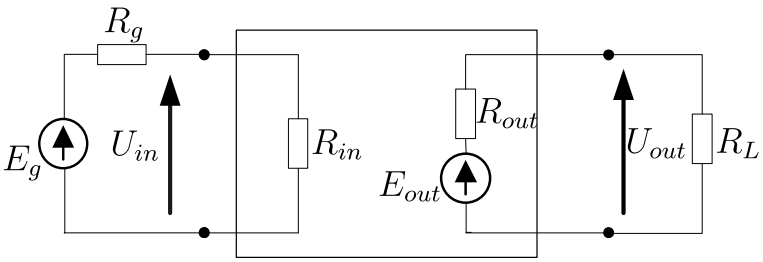


$$E_{out} = A_{V_0} \cdot U_{in} \qquad U_{out} = A_V \cdot U_{in}$$

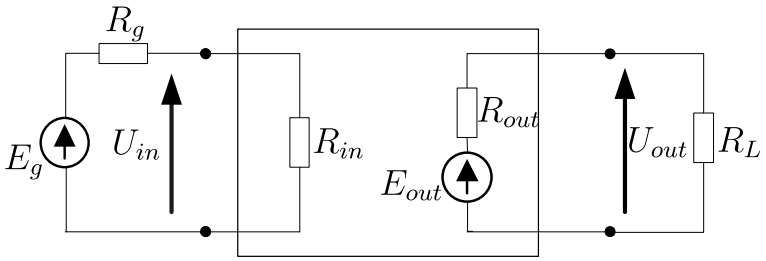
$$A_V = A_{V_0}$$



$$A_V = \frac{U_{out}}{U_{in}} = \frac{E_{out}}{U_{in}} \cdot \frac{U_{out}}{E_{out}} = A_{V_0} \cdot \frac{R_L}{R_L + R_{out}}$$



$$A_{V_{eff}} = \frac{U_{out}}{E_g} = \frac{U_{in}}{E_g} \cdot \frac{E_{out}}{U_{in}} \cdot \frac{U_{out}}{E_{out}} = \frac{R_{in}}{R_{in} + R_g} \cdot A_{V_0} \cdot \frac{R_L}{R_L + R_{out}} = \gamma \cdot A_V$$



$$P_{in} = \frac{U_{in}^2}{R_{in}} \qquad P_{out} = \frac{U_{out}^2}{R_L}$$

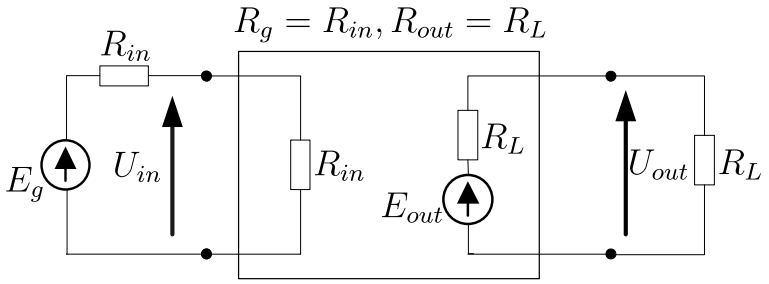
$$A_P = \frac{P_{out}}{P_{in}} = \frac{U_{out}^2}{U_{in}^2} \cdot \frac{R_{in}}{R_L} = A_V^2 \cdot \frac{R_{in}}{R_L} \qquad R_{in} =\propto R_{out} = 0$$

$$A_{P(dB)} = 10log\left(\frac{P_{out}}{P_{in}}\right) = 10log\left(A_V^2 \cdot \frac{R_{in}}{R_L}\right) = 20log(A_V) + 10log\left(\frac{R_{in}}{R_L}\right) =$$

$$A_{V(dB)} + 10log\left(\frac{R_{in}}{R_L}\right)$$

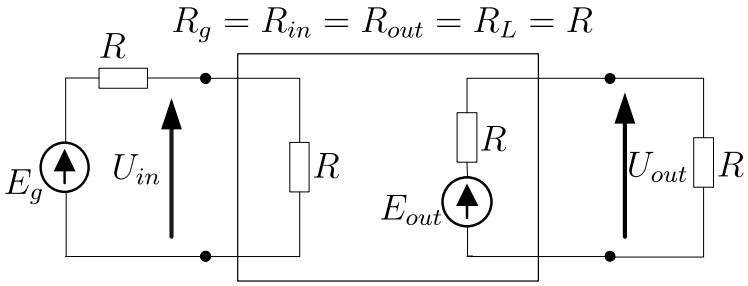
$$P_{inmax} = \frac{E_g^2}{4R_g}, P_{outmax} = \frac{E_{out}^2}{4R_{out}}$$

$$A_{Pavailable} = \frac{P_{outmax}}{P_{inmax}} = \frac{E_{out}^2}{E_g^2} \cdot \frac{R_g}{R_{out}} = A_{Veff}^2 \cdot \frac{R_g}{R_{out}}$$



$$P_{inmax} = \frac{E_g^2}{4R_g} = \frac{U_{in}^2}{R_{in}} \qquad P_{outmax} = \frac{E_{out}^2}{4R_{out}} = \frac{U_{out}^2}{R_L}$$

$$A_{Pavailable} = \frac{P_{outmax}}{P_{inmax}} = \frac{E_{out}^2}{E_g^2} \cdot \frac{R_g}{R_{out}} = \frac{U_{out}^2}{U_{in}^2} \cdot \frac{R_{in}}{R_L}$$



$$A_{P(dB)} = A_{Pavailable} = A_{VdB} = A_{Veff(dB)} - 6$$