1、《Fundamentals of Microelectronics》第 8 章习题 70

Using ac analysis in Multisim, plot the frequency response of the circuit depicted in figu.8.68.

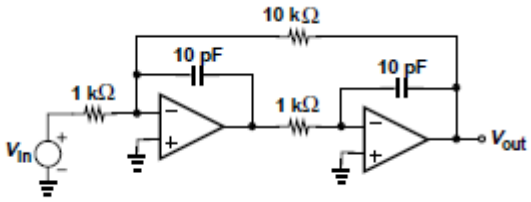
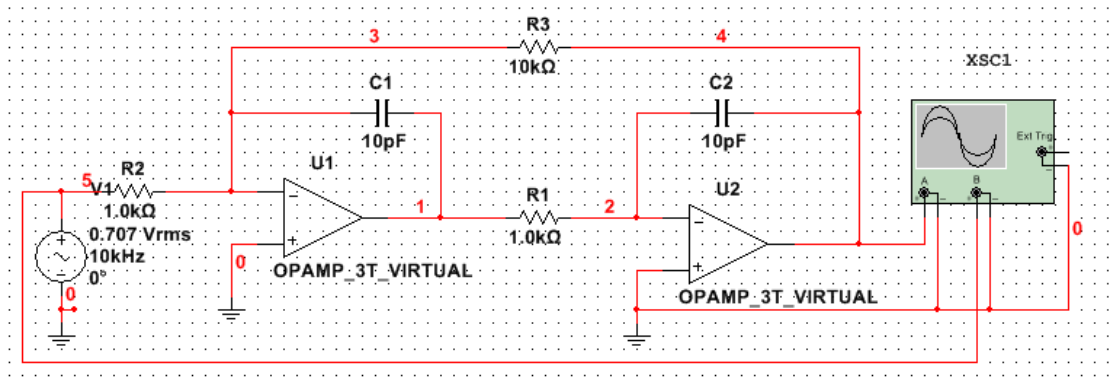
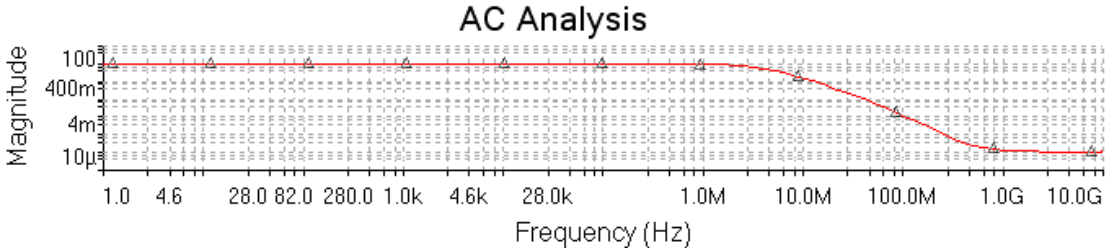


Figure 8.68

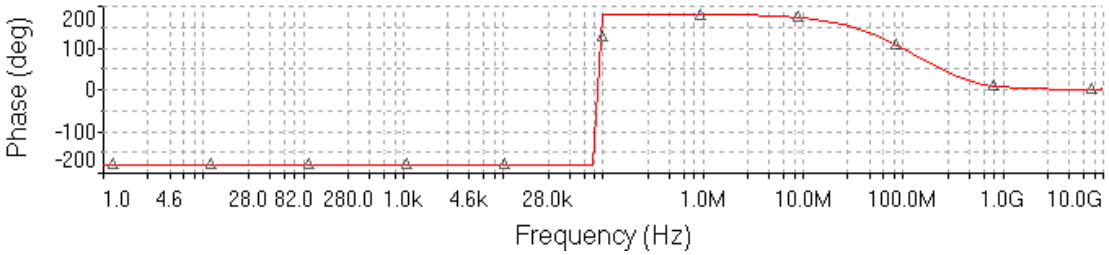
仿真电路图：



幅频响应曲线：



相频响应曲线:



通过 OPAMP 的等效电路图，利用 Laplace 变换可以求出电路的闭环传递函数：

$$\frac{Vout}{Vin}=\frac{A1A2R3}{[R1+R3+(1+A1)R1R3C1S]+[1+(1+A2)R2C2S]-A1A2R1}$$

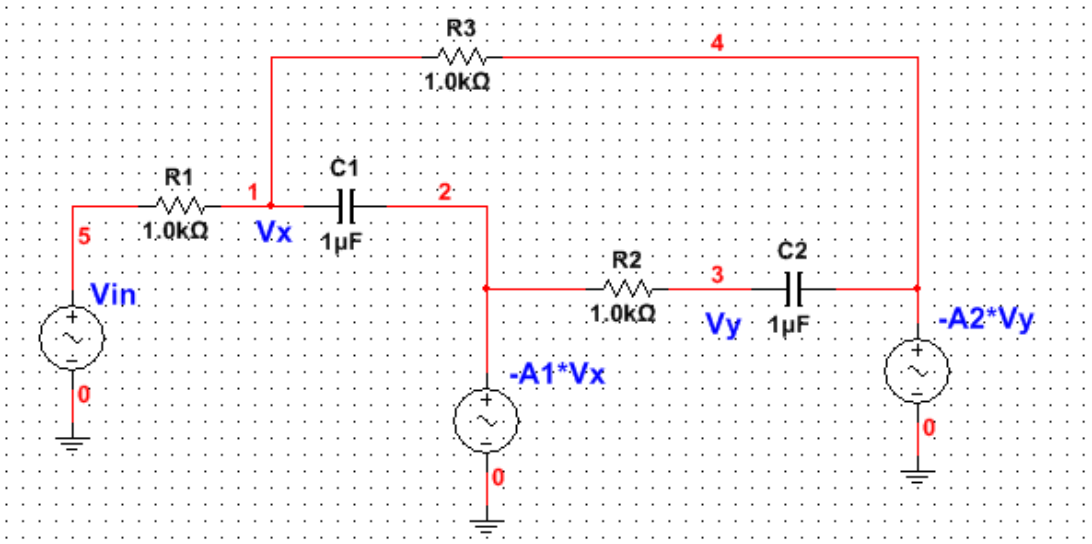
其中 S=jw，则在低频段时，上式的分母部分可近似等于-A1A2R1

于是，低频时上式可等效为：

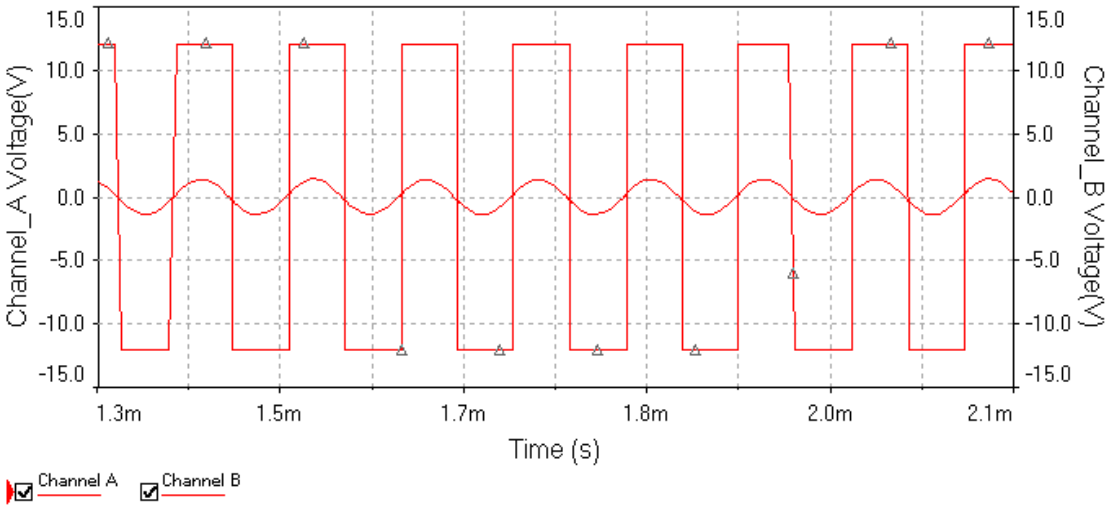
$$\frac{Vout}{Vin}=-\frac{R3}{R1}$$

即低频时增益为-10

OPAMP 的等效电路图：



输入输出波形图：



作用：在低频段，电路可当做一个比较器，输出方波；中频段，对波形幅度有抑制作用，输出变形的方波；在高频段，输入信号基本被隔绝，电路呈现出低通特性。