電子電路實驗 5: Differential Amplifiers

實驗結報

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1 實驗結果

1.1 Differential Gain

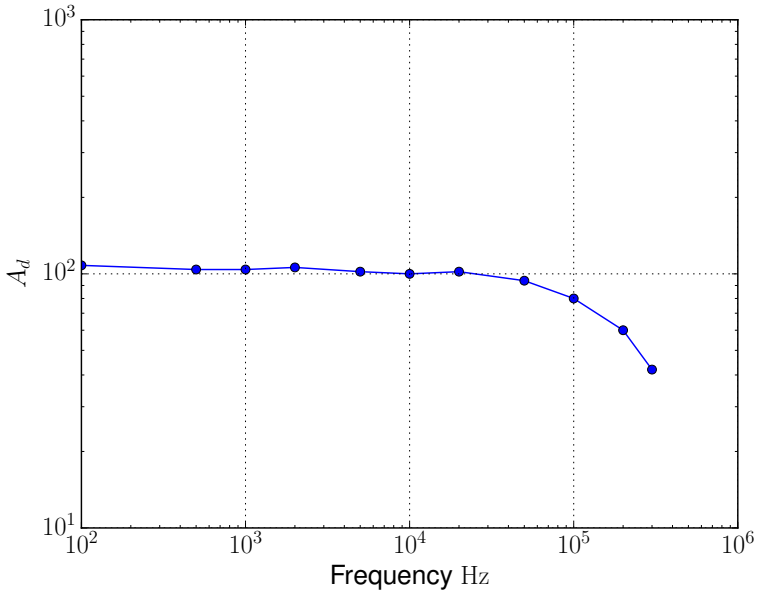

Figure 1: A_d Blot plot.

1.2 Common Gain

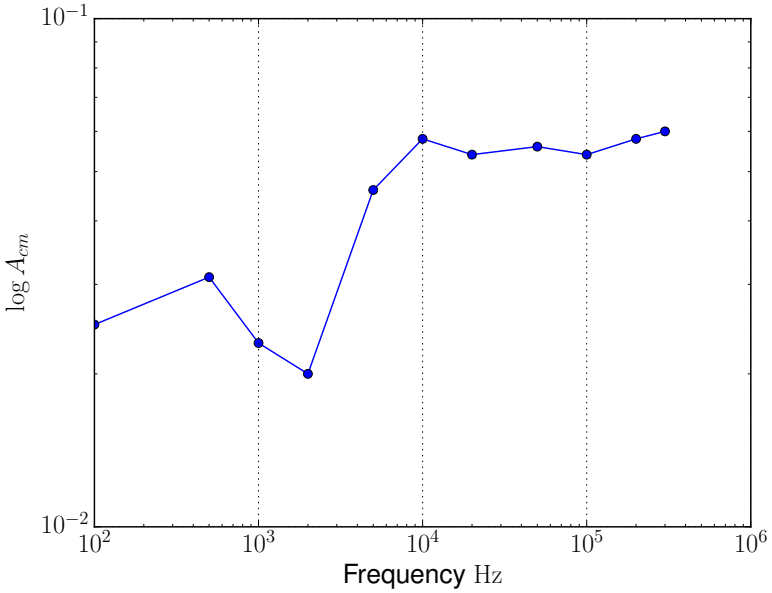

Figure 2: A_{cm} Blot plot.

1.3 CMRR

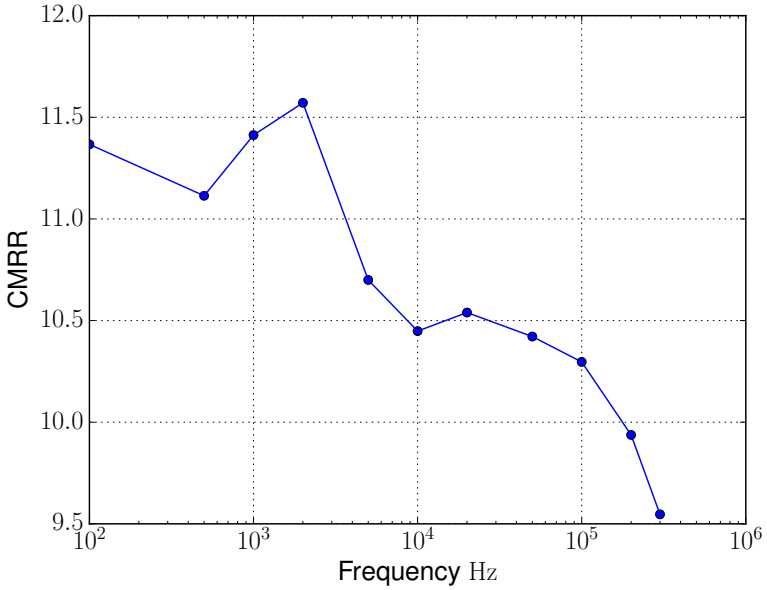

Figure 3: CMRR

2 結報問題

1. In Fig. 4, the differential mode input and common mode input can be adjusted independently and not be interfered for each other. Let $I = 1\,\text{mA}, R_{C1} = R_{C2} = 10\,\text{k}\Omega$.Use PSIPCE to find:

   答:

   (a) Transfer curve, where the input range of differential mode is around $\pm 50\,\text{mV}$, and the internal resistor of the current source $R = \infty$.

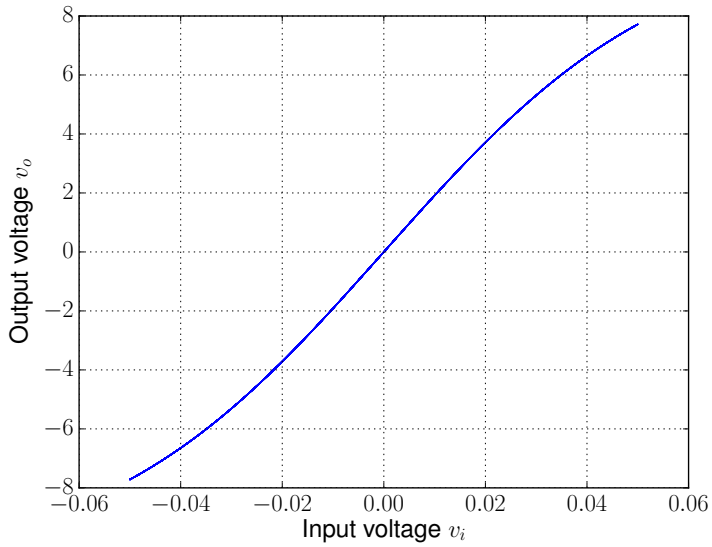

Figure 4: Transfer curve in differential mode

   (b) R_{id} and A_d, where the internal resist or of the current source $R = \infty$.

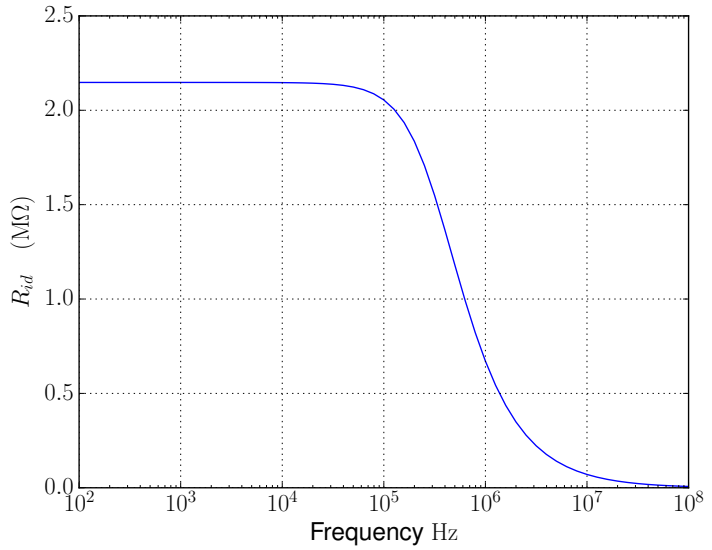

Figure 5: Plot of R_{id}

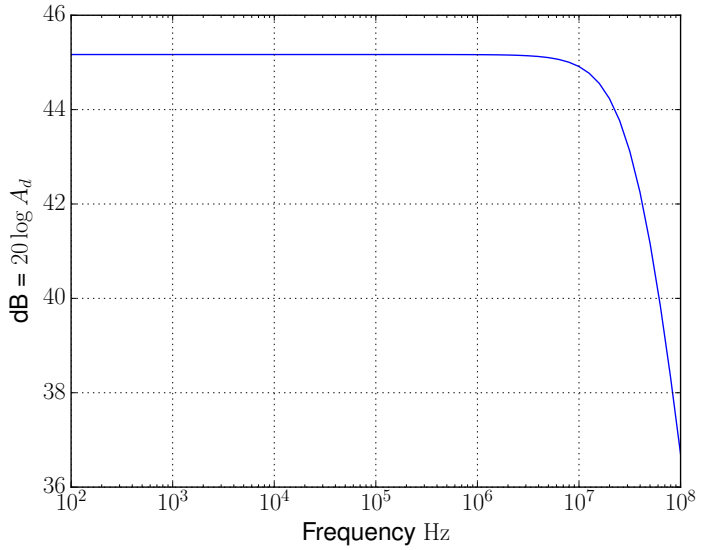

Figure 6: Blod plot of A_d

(c) R_{icm} and A_{cm}, where the internal resist or of the current source $R = \infty$.

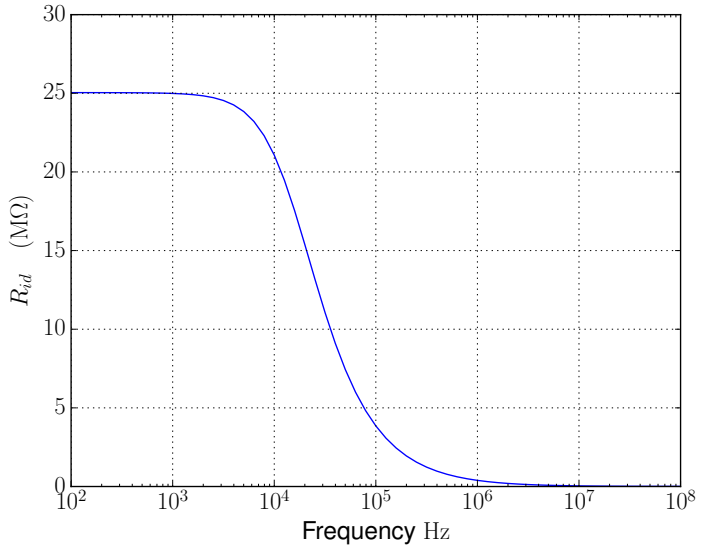

Figure 7: Plot of R_{icm}

Due to the symmetry of the circuit, A_{cm} is 0.

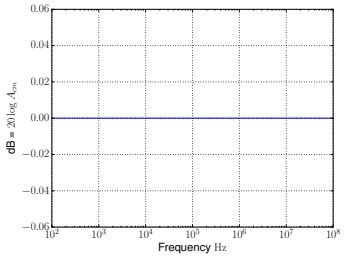

Figure 8: Blod plot of A_{cm}

(d) R_{icm} and A_{cm}, where the internal resist or of the current source $R = 200\,\mathrm{k}\Omega$.

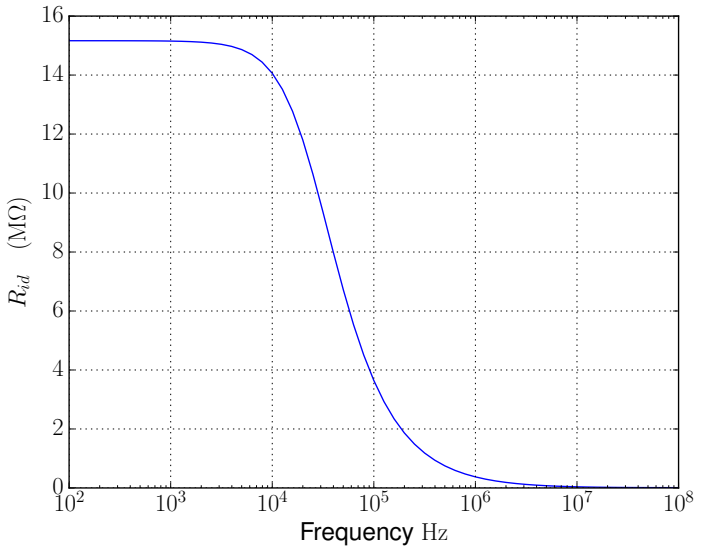

Figure 9: Plot of R_{icm}

Due to the symmetry of the circuit, A_{cm} is 0.

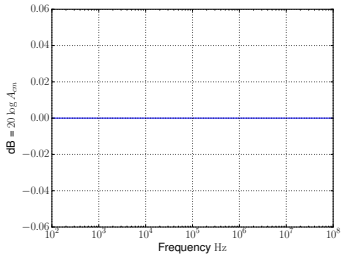

Figure 10: Blod plot of A_{cm}

3 心得

今天是自從上個月以來第一次開始做實驗。雖然過了很久記憶會模糊，不過我們都還記得一件事情：出了問題，換儀器就對了！本來以爲這樣就可以早早做完實驗早早去吃飯，沒想到我在檢查的時候，波形變成麥當勞波形，當場被打回票。最後弄一弄才知道原來是示波器的線鬆了。然後我們要去吃飯時店也幾乎都關了，只好去麥當勞怒吃雞塊了。