# Non-inverting Amplifier Offest Nulling

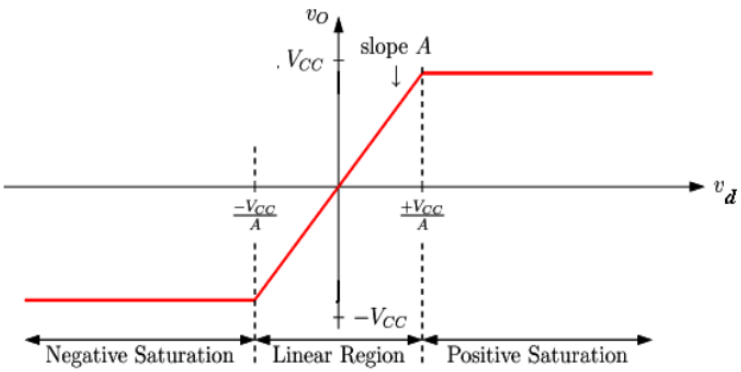
Jairui Huang(黄家睿)
202283890036

## Introduce and Aim

Negative feedback is a fundamental concept in operational amplifier (op amp) circuits that enhances stability, precision, and bandwidth. In a non-inverting voltage amplifier, negative feedback ensures that the output voltage closely tracks the input signal while maintaining high gain and minimal distortion. This configuration amplifies the input without inverting its phase and provides advantages such as reduced sensitivity to component variations, improved linearity, and controlled gain. By applying feedback, the amplifier becomes more stable, with predictable behaviour, and operates effectively across a wide range of frequencies, making it ideal for signal amplification in precision applications.

## Theory

The voltage transfer characteristic ($V_o$ versus $V_i$) for a negative feedback non-inverting op amp is shown below in Figure 2. It shows an increased linear region due to the reduction in gain. The feedback section consists of $R_f$ a fixed resistor in series with a variable resistor $R_g$. The addition of the variable resistor in series with the fixed resistor allows the feedback section to be varied between and thus allow control over the gain of the amplifier.




## Experiement method and result

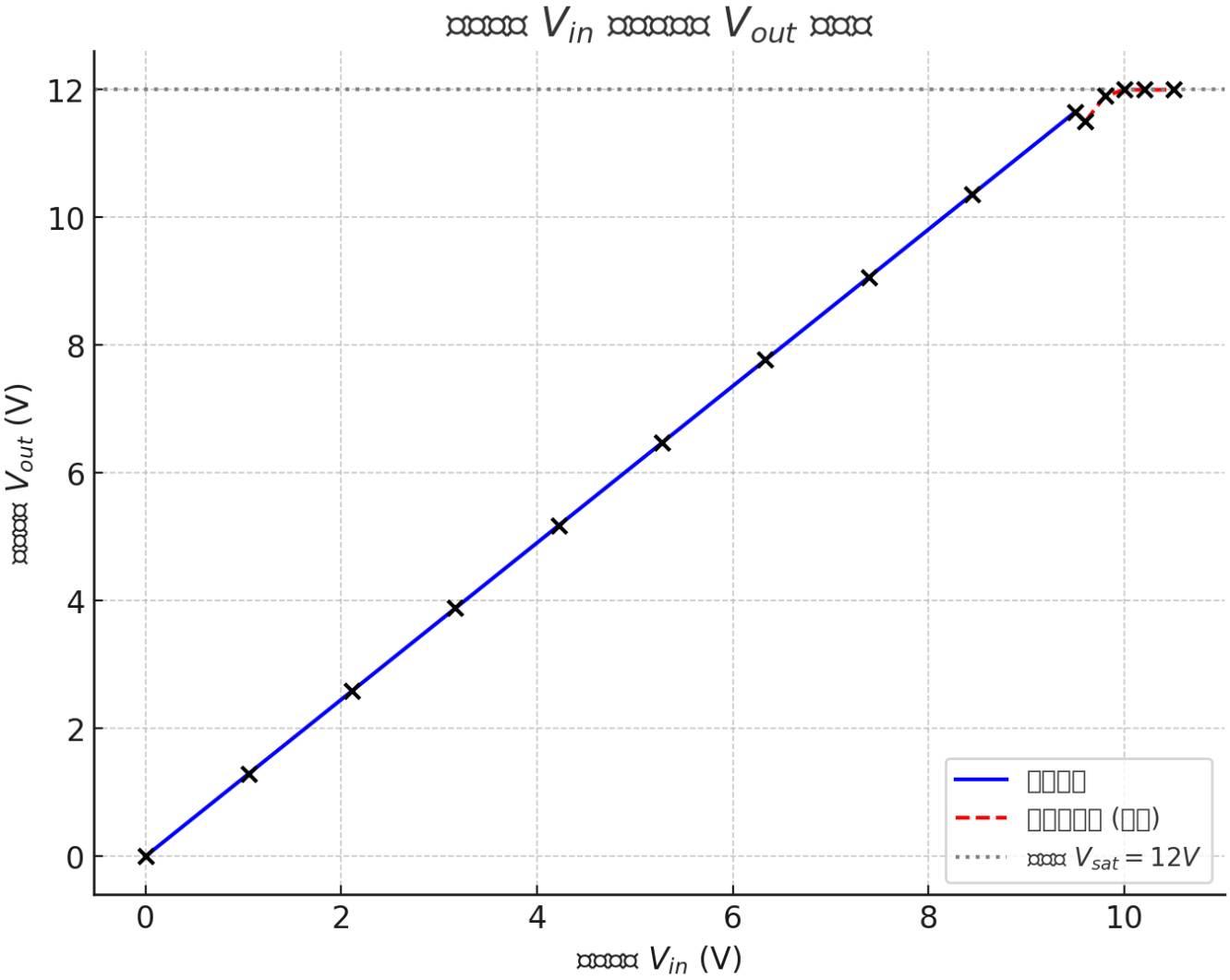
### The output of the $V_o$ and $V_in$

In this part we first set the $R_g$ to 500$\Omega$ ,then we vary the $R_g$ between 500$\Omega$ and $100\Omega$

The output is showed below:

| The resisent of $R_g$ | The output of the voltage | The negitive input of voltage | The gain |
|---|---|---|---|
| 500 | 31.1 | 37.3 | 1.2 |
| 400 | 30.8 | 37 | 1.2 |
| 300 | 30.6 | 36.7 | 1.2 |

| The resisent of $R_g$ | The output of the voltage | The negitive input of voltage | The gain |
|---|---|---|---|
| 200 | 30.3 | 36.36 | 1,2 |
| 100 | 30 | 36.2 | 1.2 |
| 50 | 29.9 | 35.9 | 1.2 |
| 0 | 29.8 | 35.76 | 1.2 |




## Conclusion

This experiment has thoroughly explored the performance of the 741 operational am□plifier in a negative feedback non-inverting voltage amplifier circuit. The relationship between gain and feedback resistance has been accurately determined, and the impact of negative feedback on stability, linearity, and bandwidth has been clearly demonstrated. The insights gained from this experiment will significantly contribute to the design and optimization of amplifier circuits in future practical applications.