# Stability analysis puzzles:

Fig.1 is a block which implement a constant current source. The current is determined by the voltage of G2 and the resistor. It is a classical circuit. The 2pF capacitor is used for the stability.

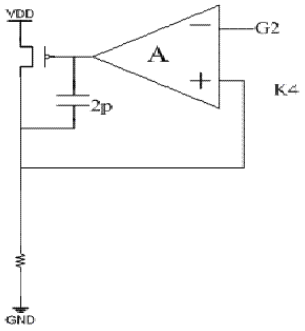


Fig.1 The diagram of the block

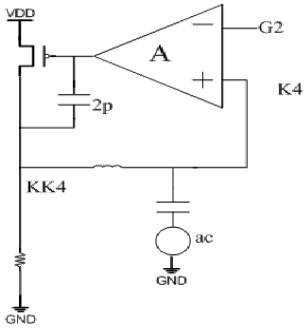


Fig.2 Loop stability analysis method one

The loop breaking point is K4. The inductor and capacitor used in AC source is 1000MH and 1000MF, respectively. We monitored the KK4 point. Figure.3 gives the simulation results.

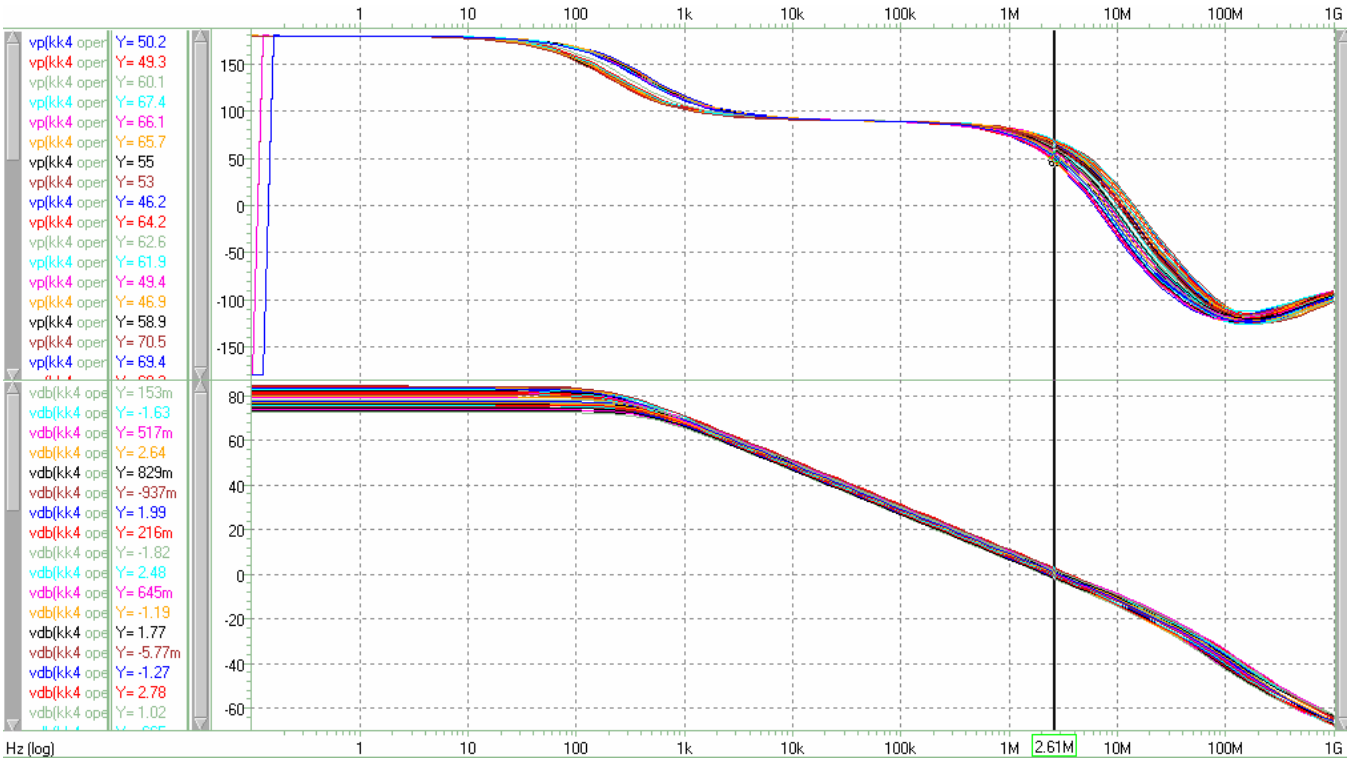


Fig.3 loop gain and phase of method one

It shows that the phase margin is about 70 degree and the loop is stable.

Figure.4 gives another loop breaking loop method and gives very different simulation results. It is broken at K6 and Fig.5 gives the simulation results.

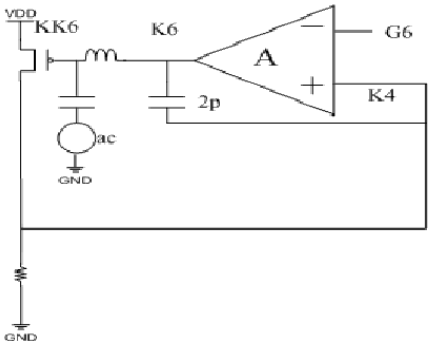


Fig.4 Loop stability analysis method two

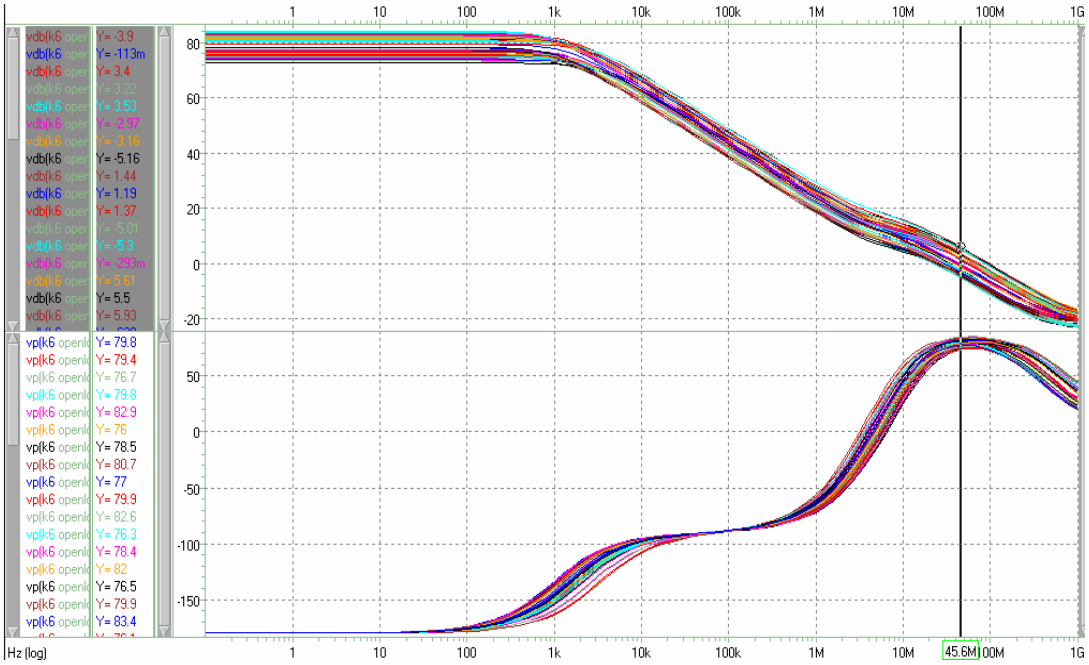


Fig.5 loop gain and phase of method two

From above simulation diagram, it is unstable because at 0 degree phase, the gain is larger than one. It seems unstable.

I added a step response to check the stability. It shows it is still stable. Pls. refer Fig.6 and Fig.7

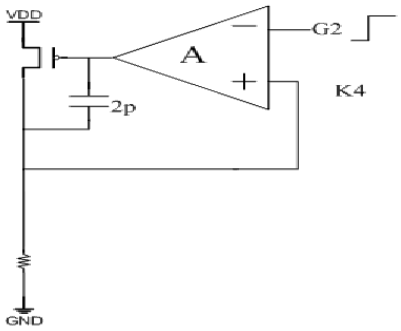


Fig.6 Step response

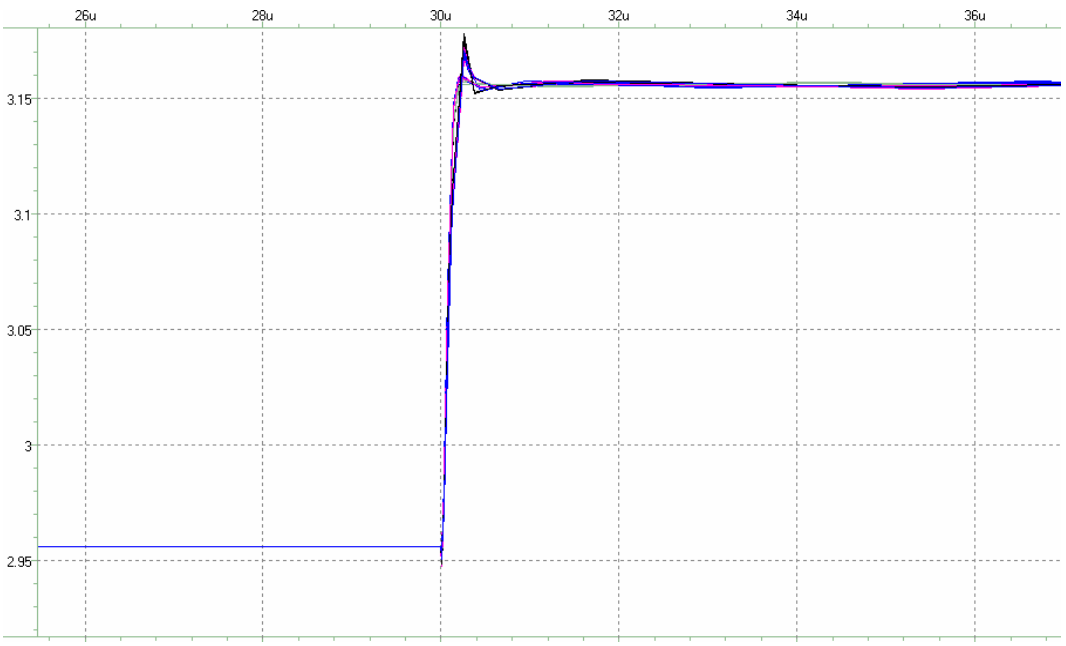


Fig.7 transient waveform of step response

So which one is correct? Why discrepancy for the two loop gain analysis? What's wrong with it?