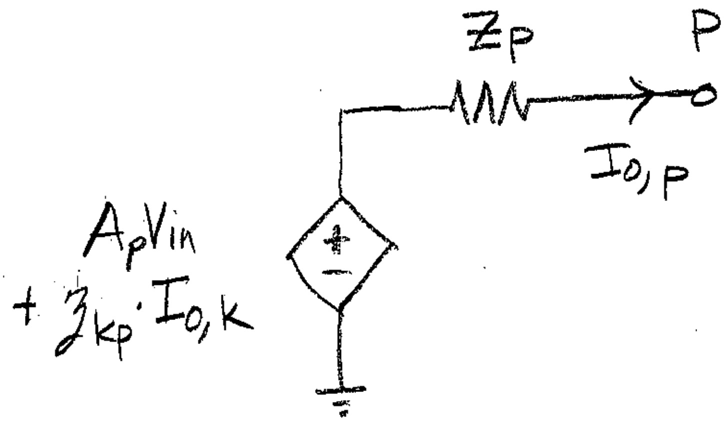
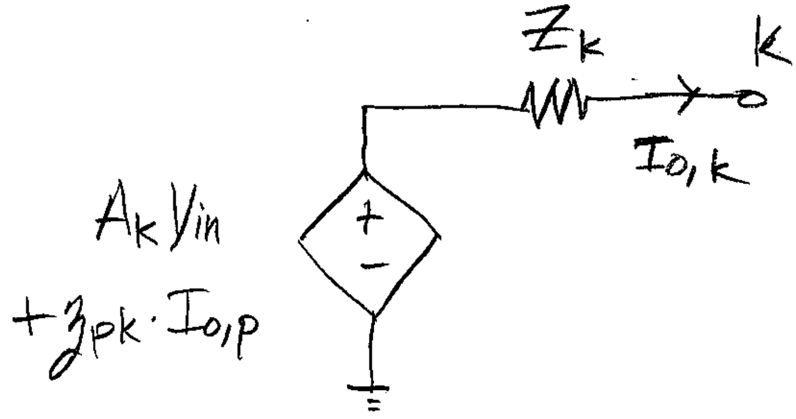
Looking in to the plate output node, there is a Thevenin equivalent circuit:



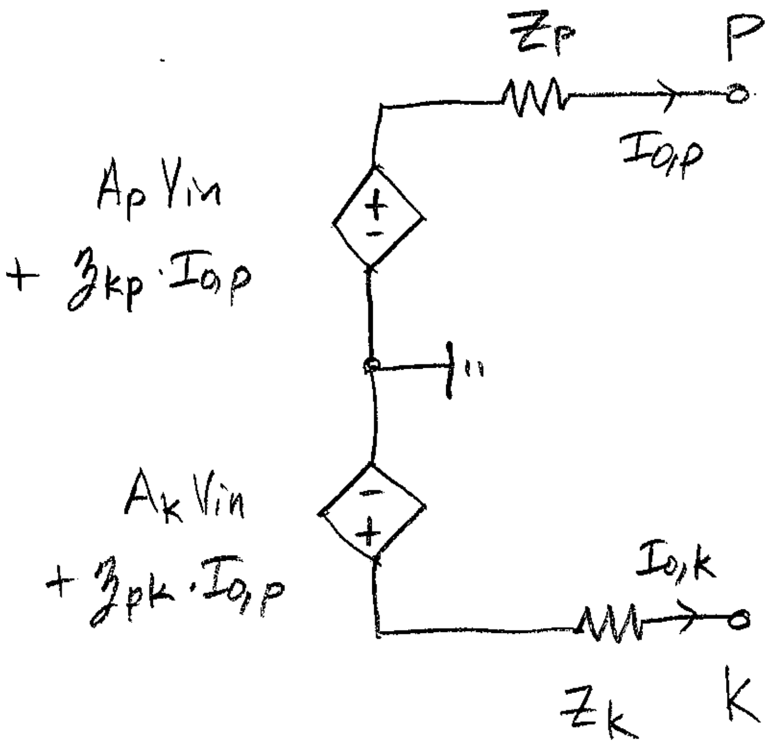
The (AC) voltage P is: $V_P = A V_{in} + \mathfrak{Z}_{kp} I_{o,k} - Z_p I_{o,p}$

Note that the voltage at the plate node P depends on 3 terms: V_{in}, $I_{o,k}$ & $I_{o,p}$. But only one of those terms involves Z_p, the output impedance. This is crucial! If your are using the voltage at node P to determine Z_p, you must zero the other two terms or, at least, the change in the other two terms.

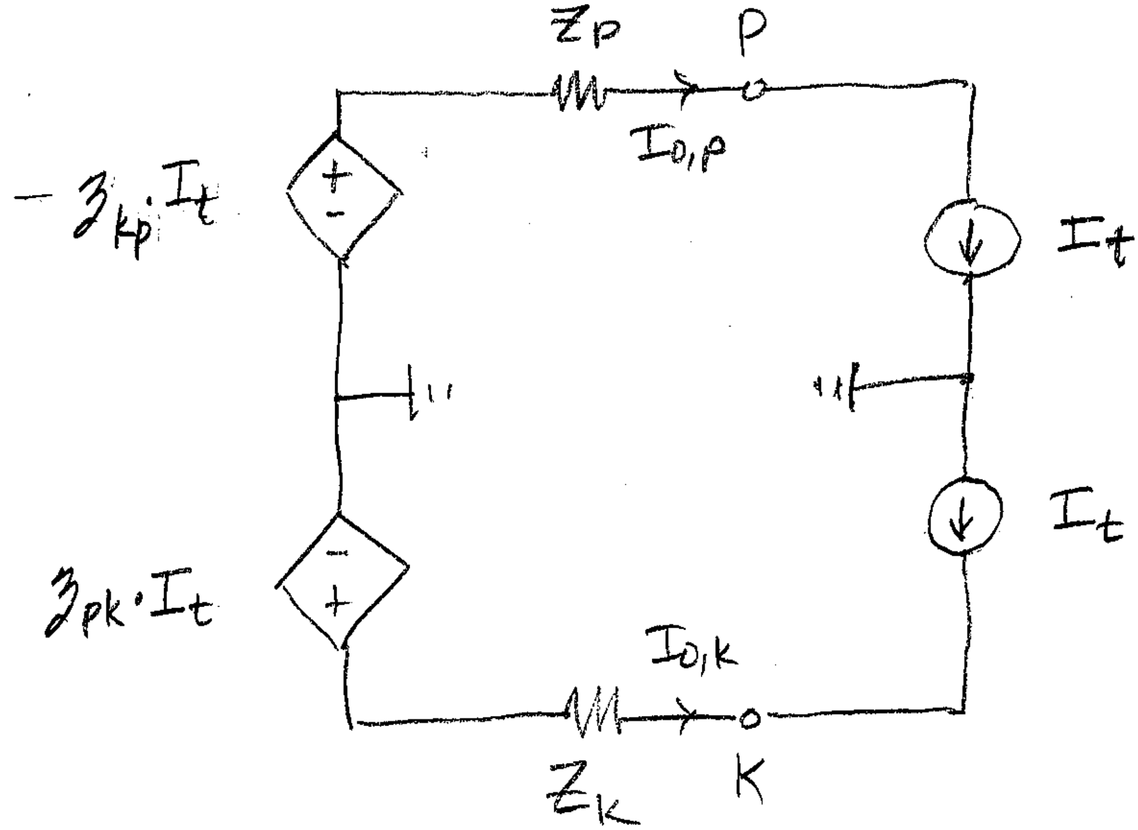
A similar Thevinin equivalent circuit exists for the cathode output node:



Putting these together:



To measure Z_P & Z_K using the voltage at P & K requires that V_{in} & the other node's current be zeroed. IF equal & opposite node currents are used, Z_P & Z_K cannot be found.



The voltage @ P : $V_P = -(z_{kp} + Z_P) I_t$

The voltage @ K : $V_K = (z_{pk} + Z_K) I_t$

Since the transfer impedances, z_{kp} & z_{pk} contribute to the voltage at the output nodes, Z_P & Z_K cannot be found unless z_{kp} & z_{pk} are known