Preamp in voltage mode

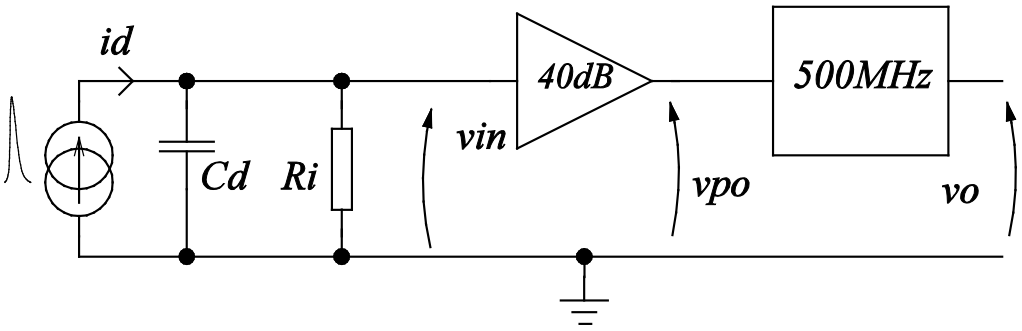


Fig1. Preamplifier working in voltage mode.

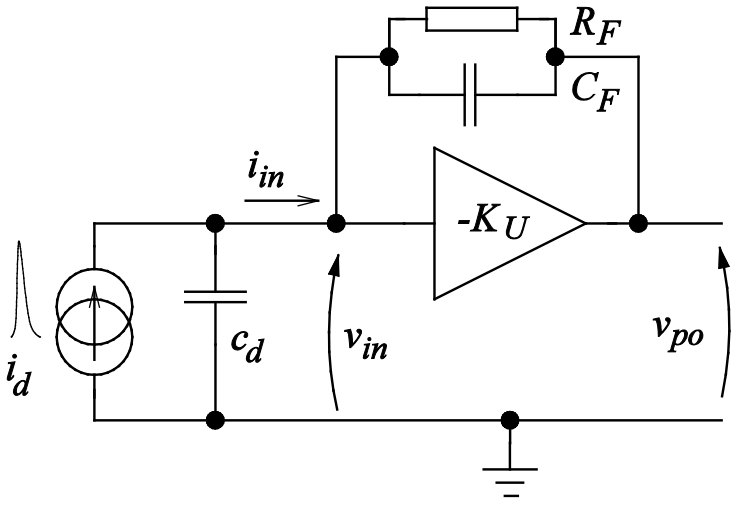
Response (vo(t)) can be found solving following equations.

Voltages:

$$vin = id\ \frac{1}{s\ Cd+\frac{1}{Ri}} = id\ \frac{Ri}{1+s\ Cd\ Ri} \qquad vo = vin\ Ku(s) = vin\ \frac{Ku}{1+s\ \tau_{P0}}$$

Where τ_{P0} defines bandwidth of the amplifier (for 500MHz 3dB bandwidth τ_{P0} =0.32ns)

Preamp in charge/transimpedance mode



Assuming high Ku the amplitude response does not depends in first order on c_d.